VOLUME XXVI JUNE 1933 NUMBER 6

Southern Medical Journal

Journal of the Southern Medical Association

Published monthly by the Southern Medical Association, Empire Building, Birmingham, Ala. Annual subscription $4.00. Entered as Second-Class Matter at the Post Office at Birmingham, Ala., under act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of March 3, 1917, authorized Dec. 20, 1921.

Southern Medical Association, Twenty-Seventh Annual Meeting, Richmond, Virginia, November 14-17

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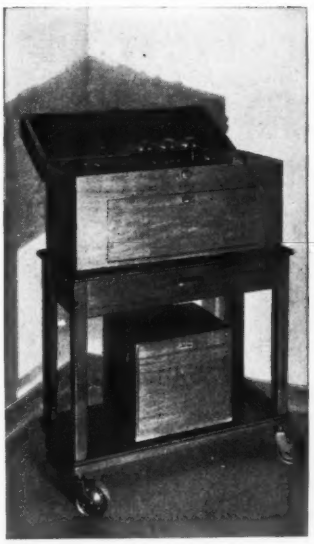

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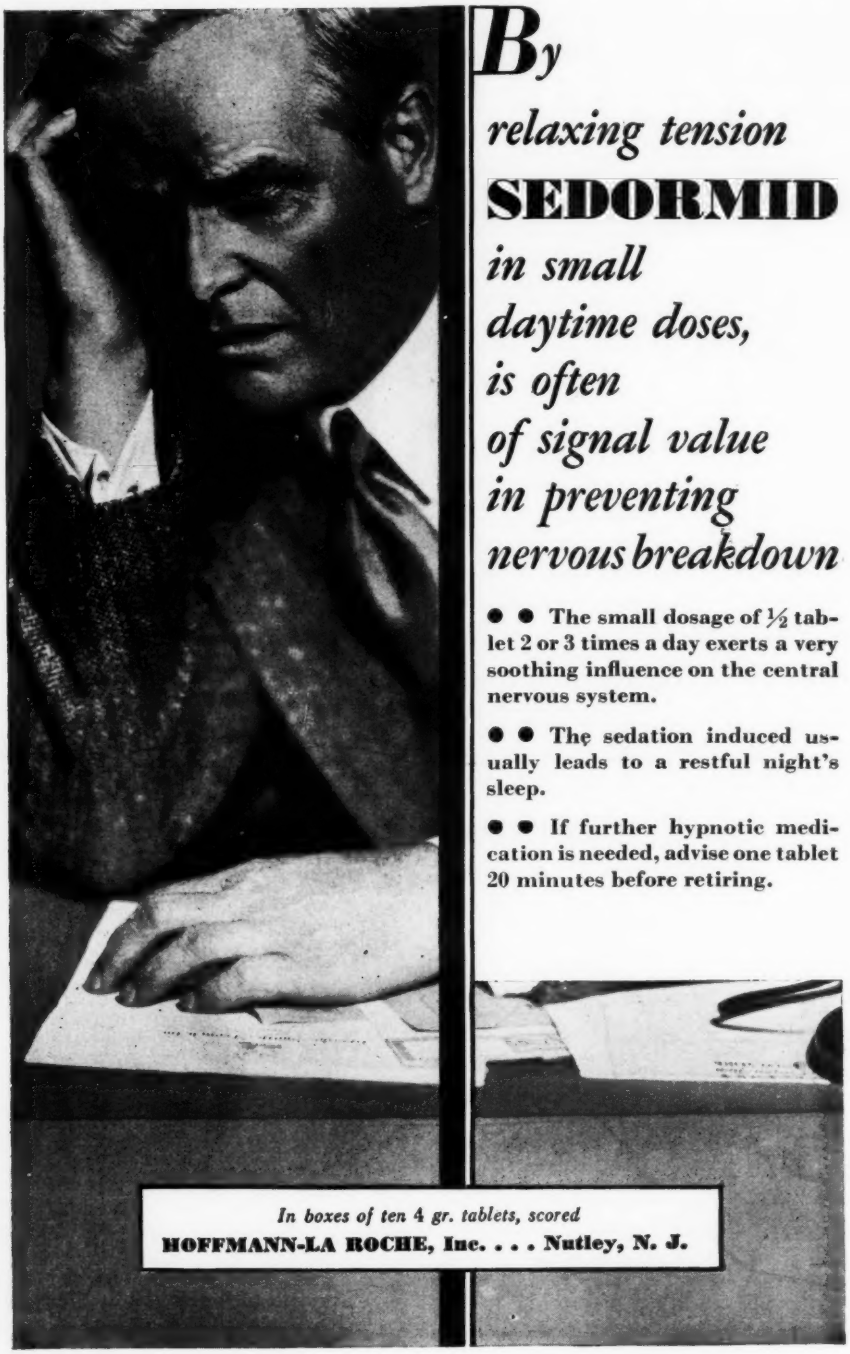
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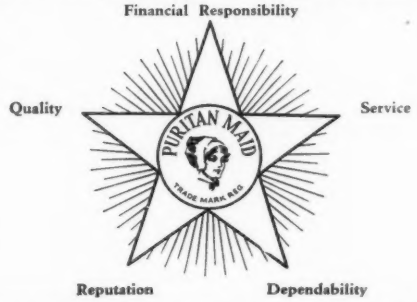

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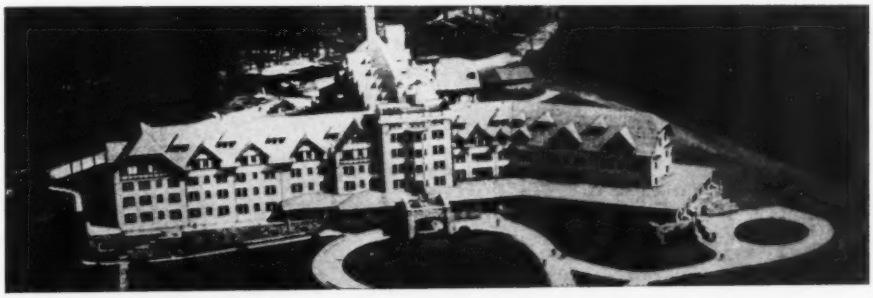

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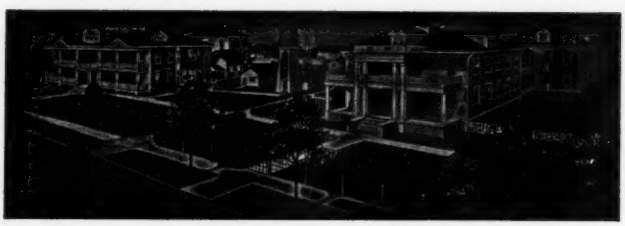

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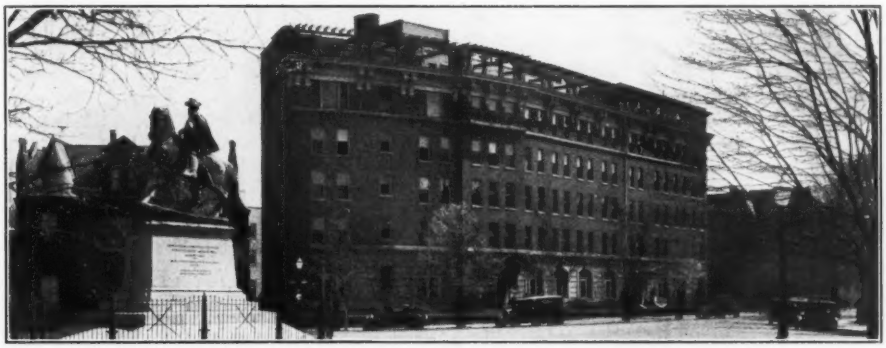

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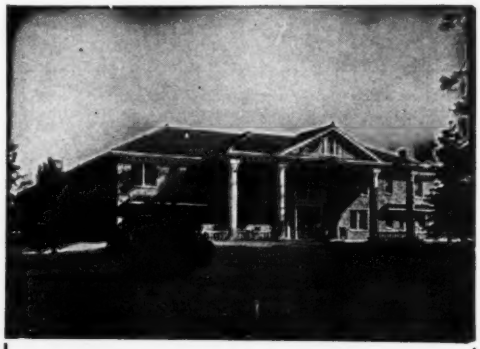

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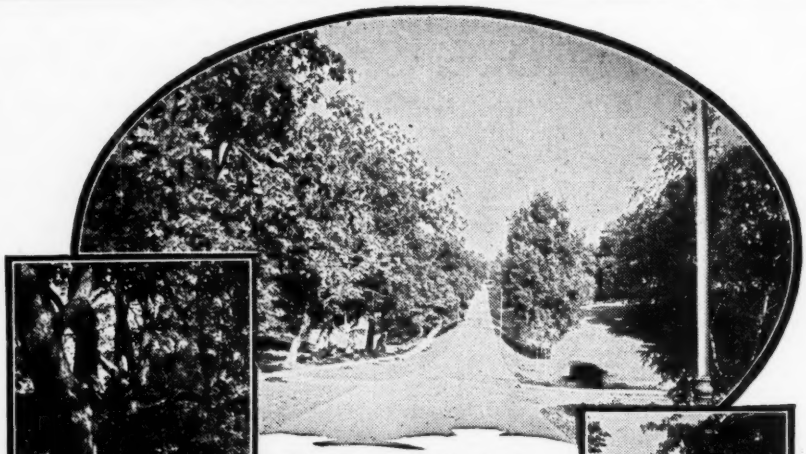

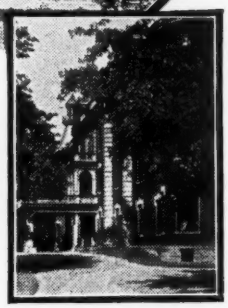

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Volume XXVI JUNE 1933 Number 6

PRIMARY DISEASES OF THE RETINAL BLOOD VESSELS*

By W. R. BUFFINGTON, M.D.,
New Orleans, La.

In selecting this subject for presentation before this body of medical men, I have taken advantage of my position as Chairman of your Section to discuss some of the rarer diseases of the eye, diseases about which little is known.

The stimulus which was instrumental in causing me to discuss primary diseases of the retinal blood vessels was seeing, in a patient of one of my confreres, recurrent, massive retinal and vitreous hemorrhages in one eye and multiple aneurysms of the retinal arteries in the other. The patient, a highly intelligent man just past middle life, felt keenly the terrible tragedy of impending blindness, and had consulted the highest medical authority in this country in order to find if possible the cause and arrest the progress of the disease. Every physical examination was negative. His vascular system was not sclerosed beyond his age; yet, there was a primary disease of the retinal blood vessels slowly progressing toward blindness.

I began to search the literature and found a few similar cases. Nothing could be found from the experience of the masters of ophthalmology, past or present, to give me the slightest data as to why a healthy, normal individual, slightly past middle life, should have so serious a disease confined to the blood vessels of one of the organs of the special senses.

The term, primary diseases of the retinal blood vessels, is used in a relative sense. Many of you may not agree with my classification or interpretation, but the subject is so interesting that I am constrained to give you the data which follows. I shall leave out of this discussion the ocular changes known to be the result of general vascular sclerosis, albuminuria, diabetes, and lues. The primary diseases of the retinal blood vessels, like vascular diseases in all parts of the body, are characterized by various symptoms. Among these are changes in the blood vessels themselves, such as spasms or abnormal dilatation, or the formation of vascular neoplasms. The changes in the retina or other structures of the eye, secondary to the vascular diseases, are: hemorrhages, exudates, hyperplasia, degeneration, and atrophies. The subjects to be discussed are:

(1) Angiospasms or spasms of the retinal arteries.

(2) Aneurysms of the retinal blood vessels (*Figs. 1* and *2*).

(3) Eales' disease, or recurrent retinal and vitreous hemorrhages of unknown cause.

(4) Changes in the eye due to indirect injury, known as Purtscher's disease or traumatic angiopathic retinitis (*Figs. 3, 4* and *5*).

(5) Vascular changes due to direct injury to the eye (*Figs. 6, 7* and *8*).

(6) Coats' disease, or retinitis externa, with massive exudate (*Figs. 9, 10, 11* and *12*).

In selecting these subjects, you will agree that each subtitle, if discussed in detail, is sufficient to occupy the time allotted to me for this talk. I have had drawings made to illustrate some of the subjects, to clarify my interpretations, and to lend brevity to the discussion.

Angiospasm can affect the brain, the heart, or the eye. In some instances, I dare say, it affects two of these simultaneously.

The first case of authentic angiospasm of the retinal arteries was reported by Zehendor in 1866. In this case the application of an ice bag to the eye precipitated the attack. Greenwood[1] discusses the subject. Wageman reports a case of retinal angiospasms, which finally remained permanently closed after repeated attacks. The spasms in this case must have been due to endarteritis obliterans. Dean[2] reports a case which he saw during an attack. A. Knapp[3] discusses five cases. All except one were in middle or past middle life, with vascular sclerosis. The one exception, a patient, age 32, was seen during an attack. Arteries affected were small, pale, and thin. This patient had an attack of headache, nausea, and vomiting, in addition to the obscuration of vision from the spasm. The

*Chairman's Address, Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

lower half of the visual field was lost during the attack. Bruns[4] gives details of an interesting case; the fundus were examined during the attack. Both eyes were affected. Vision in each eye was reduced to counting fingers. The fundus picture was that described as typical of embolism of the central artery for which it could have been mistaken had the condition not been bilateral. The complaint was of failing vision for two weeks. The patient, age 14, weight 70 pounds, was anemic. He was first seen in 1908 and kept under observation until December, 1909. More than a year elapsed before normal vision returned. Points of interest in this case are the gradual onset and the slow return of vision to normal. Treatment was systemic. Bruns quotes Parisotti, who saw a case of ophthalmic migraine with associated hemianopsia of the lower field. The arteries of the upper retina were narrowed during the attack.

Halbertson[5] reports two cases which resembled central retinal embolism with sclerosis. Vision returned in both cases. Bey,[6] quoting Redslab and Abadie, considers retinal embolism rare, but spasm of the central artery common. He reports one case. King, in 1931, reported three cases. *Case 3* resembled a retrobulbar neuritis. A woman, age 33, had central scotoma. Her vision returned to normal in 24 hours; the narrowed retinal arteries widened. Davenport[7] saw a patient during an attack. He saw all symptoms disappear as vision returned. He thinks angiospasm is due to a derangement of the neuromuscular mechanism in arterial plain muscle. Toxemia may be the cause. Beach[8] reports a case of obstruction of the central retinal artery, simulating embolism of this vessel. Beach bases his discussion on the hypothesis that the obstruction may be caused by an embolus, endarteritis obliterans, or angiospasm. He wonders where, in a healthy individual free from arterial, cardiac or kidney diseases, the embolus originated; and, as Mule suggests, where does it go when treatment results in the relief of an obstructed artery. Beach and Mule both think that arterial disease is at the bottom of these cases and that sudden closure may often be attributed to spasm provoked by it. "The hold which the notion of embolism has on the imagination of the profession is still unbroken." Seventy-six per cent of reported cases of obstruction during the last six years are classified as embolism. Medical authorities, however, are coming more and more to regard obstruction as due to endarteritis or spasm rather than to embolism.

Reports prove that central retinal obstruction is often relieved and vision restored partially or in full. Patients have recovered weeks after the onset. Therefore, a case simulating retinal embolism must not be given up as hopeless until every effort is made to relieve the condition. Attention should not be given to the eye alone, but focal and systemic infections should be removed. Local treatment is: massage; amynitrate inhalations; 1/10 grain acetylcholine* injections. Paracentesis has been followed by a return of vision. This procedure can and should be repeated several times before one gives up.

Retinitis pigmentosa has long been regarded as an hereditary degeneration, which begins in the neuro-epithelium. Recent experiments suggest the possibility that this symptom complex results from a chronic angiospasm brought about by primary disease of the retinal and choroidal blood vessels.

Aneurysm of the Retinal Blood Vessels.—Aneurysm of blood vessels in the human body is a comparatively common occurrence. Oculists are familiar with palsies of the extra-ocular muscles resulting from aneurysm of the blood vessels at the base of the brain. Aneurysm of the retinal blood vessels is a rare vascular change and when it is seen by an oculist no stone should be left unturned in the attempt to find a cause. As I said, I became interested in the study of retinal blood vessels after seeing a case of recurring vitreous hemorrhages in the right eye, which became entirely absorbed in two years with a return of vision. A second massive hemorrhage occurred again one year ago. In the left eye of this patient are seen multiple arterial aneurysms (*Fig. 1*). The patient is nearly sixty, of a nervous temperament. Otherwise, he is active and healthy. A most searching examination of his case has been made by the leading medical men of this country. No cause can be found for his serious intra-ocular vascular disease.

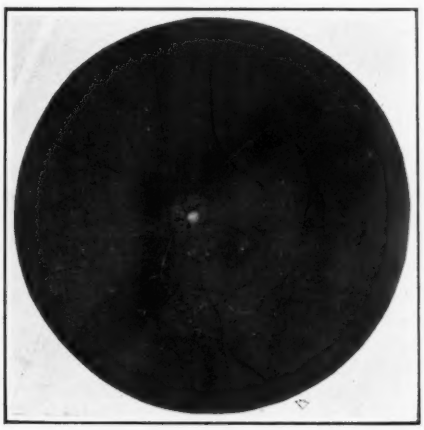

Fig. 1

Multiple aneurysms of the retinal arteries as seen on the optic disc. Patient, age 60, good health. In the right eye of this patient recurrent hemorrhages have taken place over a period of years.

*Acetylcholine is a tissue extract. In ophthalmology it is given in 0.1 gram doses subcutaneously for closure of the central retinal artery. It is supposed to be a powerful stimulant of the parasympathetic system. It produces a prompt, peripheral vasodilatation and a fall of blood pressure. Convincing results were reported by the French authorities, M. Villaret; L. Justin-Besancon; Schiff-Wertheimer; and J. Gallois (Arch. d'Opht., March, 1932).

In the light of our present knowledge, some of the cases reported as aneurysm of the retinal blood vessels must be regarded as in the early stage of massive exudative retinitis, or Coats' disease; or angiomatosis of the retinal blood vessels, known as von Hippel's disease, or recurrent retinal and vitreous hemorrhages.

In 1883 Benson[9] reported a case of multiple aneurysms of the retinal blood vessels. A study of the colored illustration which I have had reproduced and enlarged presents the following: the blood vessels have an irregular caliber in places. There is perivascular fibrous sheathing. Multiple aneurysms of both arteries and veins, taken with the massive exudate shown in the fundus picture, suggest an early stage of Coats' disease with vascular changes. This case report was given us long before Coats' classical paper on "Retinitis Externa with Massive Exudate" was written.

Fisher[10] reports a case shown in the reproduced colored drawing. A boy, age 13, was thin, poorly nourished. His father died of tuberculosis. There was no evidence of congenital lues. The picture presents multiple aneurysmal dilatations of the distal branches of the upper temporal artery. The setting is in a white perivascular sheathing (*Fig. 2*). Fisher calls the white spots noted in the retina, areas of retinal degeneration. The changes observed by him showed them to be progressive.

Pring'e[11] reported a case of multiple aneurysms of the retinal arteries which he regarded as a congenital phenomenon. The vision was normal and the condition remained stationary as long as the patient, a robust soldier, was under observation. I doubt seriously the correctness of this opinion. It can be seen that the affected artery has no relation to the opaque nerve fibers beautifully shown in the colored reproduction.

Moore[12] mentions this subject, but gives no illuminating data. In my own opinion, aneurysmal and similar changes in the retinal blood vesse'ls represent a certain stage in the primary diseases of this vascular system. The etiology in most instances is unknown. Recurring retinal and vitreous hemorrhages, Coats' disease, or von Hippel's disease represent the final stage.

RECURRENT RETINAL AND VITREOUS HEMORRHAGES

The etiology of recurring hemorrhages into the retina and vitreous in a large percentage of cases remains a mystery. The group of symptoms became known as Eales' disease after Eales' classical description reporting five cases in 1880. The disease generally occurs in young people between the ages of 20 and 30 years. Males are more often affected than females. In a large number of reported cases, low vitality and constipation, but no recognizable disease, is present. It is worthy of comment to observe the number who suffer from epistaxis. The intra-ocular hemorrhages occur at intervals of several weeks, months or years, in one or both eyes, often alternating. Temporary blindness occurs. In some cases, cessation of hemorrhages has taken place regardless of treatment; others go on to blindness from glaucoma or retinal detachment.

The earlier writers, including Eales, supposed that auto-intoxication was the cause. Graefe, in 1855, gave the first data concerning recurrent vitreous hemorrhages. He was impressed with two facts: that young people were affected and that epistaxis was frequent. Eales' five cases were in young men. Symptoms present were constipation, a depressed state of health, and all had attacks of epistaxis. Women, he thought, were free from the disease because they menstruated. A review of the literature since his time shows that women are not immune. During the last five years I have seen one woman who had recurrent intra-ocular hemorrhages.

Panas, according to Finnoff, called the disease ocular epistaxis. Panas states that in the young, arteries are affected. Noll and Kipp (Finnoff) have each reported a case of recurrent vitreous hemorrhages in active tuberculous patients. Three of five cases reported by Finnoff[13] were in active tuberculous patients. The fourth case was, he thinks, the result of dental sepsis. The fifth case, he thought, resulted from gastro-intestinal disturbance.

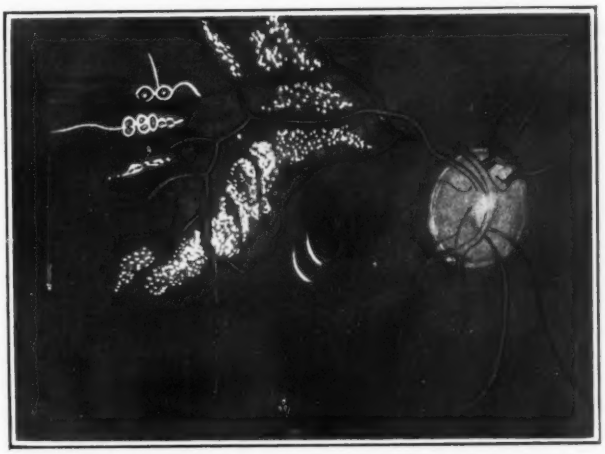

Fig. 2

Multiple aneurysms of the retinal arteries and veins. Multiple aneurysmal dilatation of the distal branches of the upper temporal artery. White perivascular setting. The observer noted progressive changes. Patient, male, age 13; thin and poorly nourished; father tuberculous. (In the light of our present knowledge this could be tuberculosis of the retinal blood vessels.) Fisher: Tr. Oph. Soc. United Kingdom, v. 23, 1903.

In summarizing, he concludes:

(1) Recurrent intra-ocular hemorrhage is not a specific disease.

(2) Tuberculosis of the retinal veins is a common cause.

(3) Focal infection is a probable cause.

(4) Blood dyscrasia does not accompany the condition.

(5) Peripheral retinal veins are mostly affected.

(6) The condition occurs in males more often than in females. The prognosis is poor.

(7) After tabulating 110 cases, he concludes that 34 were tuberculous; in 51, causes were undetermined.

Jackson[14] reviews this important subject or symptom complex. He thinks that blood dyscrasia and endocrine dysfunction are worthy at least of consideration. If the hemorrhages are the result of a localized pathological weakening of the blood vessels, is not a basic local vascular disease closely related to what one sees in cases due to tuberculosis? Eales' symptoms, patients, 14 to 20; slow pulse; much troubled with dyspepsia; low spirits; lassitude; all should be kept in mind. Finally, Jackson suggests: "It may well be that tuberculosis, *per se*, is not, but some condition arising in tuberculous patients is, the essential cause of recurring hemorrhage into the vitreous."

Karl Safar[15] regards the disease as a primary periphlebitis, beginning in the smaller veins. Histologically, it resembles tuberculous phlebitis. Others hold similar views. Treatment has been almost as varied as the cases reported. Suffice to say, the disease or symptom complex affects young people mostly. It is characterized by primary changes in the retinal blood vessels leading to recurrent hemorrhages. Blindness is often the closing scene and at the present time its etiology is one of the unsolved problems of ophthalmology. Its incidence is frequent enough to stimulate each of us to a most painstaking and thorough study of any given case which may be seen in our daily work.

TRAUMATIC ANGIOPATHY OR LYMPHORRHEA OF THE RETINA

You members of this Section are familiar with the common non-perforating ocular changes due to injury such as irido-dialysis, traumatic mydriasis, subluxation of lens, intra-ocular hemorrhage, rupture of the choroid, and Berlin's opacity and hole at the macula. It is my purpose, therefore, to step aside, discuss and illustrate some of the unusual changes from both direct and indirect injuries which affect principally the vascular system of the eye.

Traumatic Angiopathic Retinitis.—This peculiar and distinct disease was first recognized by Purtscher[16] in 1910. He noted the fact that the lesion resulted from severe concussions, causing a sudden and transient or temporary rise in the intracranial pressure. He named it traumatic angiopathic retinitis. Since that time it has been called Purtscher's disease.

In Purtscher's first case, the patient fell on his head and was unconscious for six days. The discs were slightly pale, with distinct margins. In the retinae of both eyes along the course of the larger vessels there were numerous bright shining plaques. The spots in places were astride the retinal vessels. Location therefore was in the inner retina; between the shining spots were hemorrhagic stria. The vessels were dilated. The second case followed a fall. Nineteen days after the injury white silvery plaques were noted extending from disc to macula and into the fundus periphery. The changes were along the veins. Gonin[17] and Best[18] report similar cases due to indirect injury. The lesions were situated between the discs and the maculae, along the retinal veins.

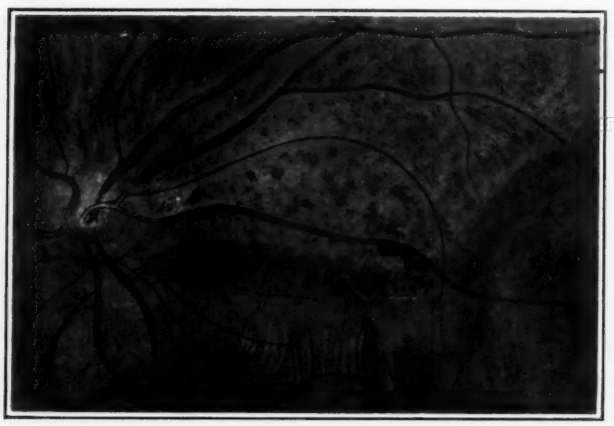

Fig. 3

Angiopathia retinae traumatica or lymphorrhagia retinae traumatica (Purtscher's disease). The zone affected, upper papillo-macular, a white opaque area spotted with pigment. The retinal blood vessels are normal, except those in the affected area. Upper temporal vein dilated. Pigment migration in the form of brown lines along the upper temporal artery and vein. Drawing made six days after injury. Bickerton: Tr. Oph. Soc. United Kingdom, 24:258, 1904.

Bickerton[19] first accurately described a case of what we now call Purtscher's disease. He made a colored illustration which I have had enlarged and copied (*Fig. 3*). Notice the white lesion extending from disc to macula. It is apparent to the eye that changes in calibre and color have taken place in the veins and arteries of the affected area. The picture was made one week after the injury. Bickerton called attention to the importance of differentiating this lesion from that fleeting macular change known as Berlin's opacity. Chou[20] illustrates a reported case by two drawings, the first a week after the injury, the second five weeks later (*Figs. 4 and 5*). Observe the similarity of lesions in this case and the one of Bickerton. The affected part of the retina is an upper zone along the superior temporal vessels. The color of the affected area changed from a milky white to a greyish yellow, as noted in the two drawings. The

Fig. 4

Angiopathia retinae traumatica or lymphorrhagia retinae traumatica (Purtscher's disease). White opaque area, upper papillo-macular zone. Dilated vein in the affected area; opacity, milky-white. A net-work of pigment is seen in the deeper layers of the retina. Note change in the pigment seen in the second drawing three weeks later. Chou: Brit. Jour. Oph., v. 12, 1928.

second picture shows the pigment changes in the form of migration along the retinal vessels probably in the perivascular lymph spaces. In this case the choroidal circulation was unaffected. Notice how free the optic disc is of change. Rados[21] illustrates a reported case which he terms Purtscher's disease. This followed a compression injury to the chest. This case, as illustrated, shows extensive vascular changes. A nasal peripapillary hemorrhage is present. Especially noticed are numerous fluffy silvery discreet areas of edema situated, as will be observed, along the veins and on them. In all probability they are extravasations of lymph from the perivascular spaces of the venous retinal system.

These cases and the reports of many similar ones leave no doubt that Purtscher's syndrome is a definite pathological entity. The causative mechanism is the most elusive problem yet to be solved. There is a history in reported cases of severe injury to the head, back, chest, or abdomen. The deduction is that following the compression injury, a sudden rise of intracranial pressure takes place. It must be assumed that the increased pressure is transient because choked disc is not a constant nor frequent factor. I shall attempt to answer the hypothetical question which naturally arises in your minds: what is the relationship between primary disease of the retinal blood vessels and the extensive changes seen in the drawings shown or described in the reported cases? Leber has proven that a direct communication between the ventricles of the brain and the intervaginal space of the optic nerve exists. The communication ends in a blind pouch, so far as is now known, at the entrance of the nerve into the eye. On the other hand, definite lymph channels exist in the eye. I mention two: the first is the suprachoroidal space between the sclera and the choroid; the second which attracts our attention in this relation is in the perivascular lymph spaces which surround the retinal veins. These veins therefore become a vital part of the intraocular lymph circulation. Although not yet a proven fact, it is logical to conclude that perivascular lymph channels of the retinal veins have a direct communication along the perivascular spaces of the central veins with the lymph spaces around the optic nerve. It must be assumed that a delicate wall surrounds the perivascular lymph channels within the eye. A sudden rise in intracranial pressure results in a backward pressure along the lymph channels leading into the optic nerve; thence, an increased pressure along the perilymph spaces of the retinal veins. The walls of these delicate spaces rupture and extravasation of lymph into the retina takes place. A negative intravenous pressure results from the rupture of the perivascular lymph channels. This negative pressure can account for the hemorrhages and vascular changes in the veins. Purtscher himself concludes that the white fluid comes from the lymph channels and the hemor-

Fig. 5

Angiopathia retinae traumatica (Chou's case). Drawing same as in Fig. 2, made five weeks after injury. The color of the opaque area has changed from milky-white to greyish-yellow. Pigment in this drawing is seen along the blood vessels, having migrated during the three weeks which elapsed from the deeper into the superficial layers. Chou: Brit. Jour. Oph., v. 12, 1928.

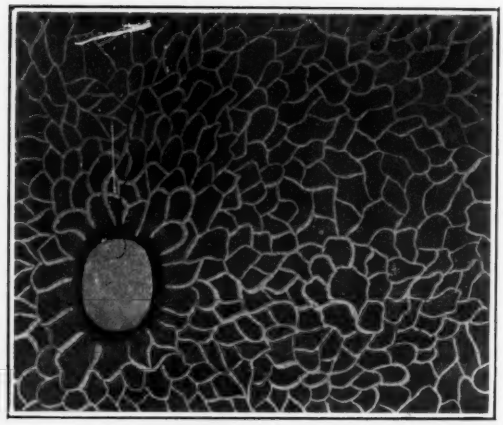

Fig. 6

Vascular changes due to direct injury to the eye. Total obliteration of the retinal blood vessels, except one. Entire absence of the pigment epithelium. Chorio-capillaris and obliteration of the central choroidal vessels by the process of sclerosis. Nutrition of the eyeball good. Jackson: Tr. Amer. Oph. Soc., v. 16, 1918.

rhages from the blood vessels, hence the name, traumatic angiopathic retinitis.

The preceding remarks have been on unusual vascular and perivascular ocular conditions following indirect injury. Now, I shall follow with a discussion of unusual vascular changes which have resulted from direct injury to the eye.

Edward Jackson[22] reports several cases based on the following facts. A history of severe injury to the eye was followed by blindness. The nutrition of the eyeball remained good in spite of the injury. In the following case from Jackson's series the extensive vascular changes are the point of interest.

There was complete destruction of the retinal vessels save one going upward; entire absence of the pigment epithelium, chorio-capillaries, and obliteration also of the central choroidal vessels by the process of sclerosis (*Fig. 6*). Jackson states that the circulation was apparently normal in the anterior segment of the eye supplied by the long posterior ciliary and the anterior ciliary blood vessels. Optic atrophy was present.

The unusual preservation of the nutrition of the eye in spite of extensive vascular changes seems to me to upset Magitot and Duke Elder's theory that the uveal tract as a whole produces intra-ocular fluid, and not the ciliary body, which structure alone is the source of the intra-ocular field, according to the able and logical contentions of Leber and Pristly Smith. The following cases of my own are illustrative of the changes mentioned in Jackson's case:

Case 1.—A white man, age 20, was struck on the left eye at the age of 4, and knocked unconscious. The tissues were swollen for some time and there was marked edema of the lids. Certain retinal changes are noted. Optic atrophy and almost complete obliteration of the retinal vessels are seen in the picture (*Fig. 7*).

Case 2.—A colored girl, age 20, was struck on the left eye three months before this drawing was made. Immediately following the accident, her vision was much reduced. Retinal hemorrhages and edema were present and the vascular changes noted in the picture were not present until about three months had elapsed. In looking at this picture one is rather inclined to think the vascular change a perivascular fibrosis, and not a complete obliteration of the vessels, such as was present in the other two cases. Noted also is the star shaped area of proliferating retinitis at the macula (*Fig. 8*).

In each of my cases the uninjured eyes were normal; the injured eyes had normal tension and clear media. No disease of any kind could be found to account for the condition. The negro girl had a negative spinal fluid. The obliteration of the vessels in my *Case 1* and in that of Jackson's case must have resulted from extensive thrombosis of the vessels involved. My *Case 2* cannot be thus explained.

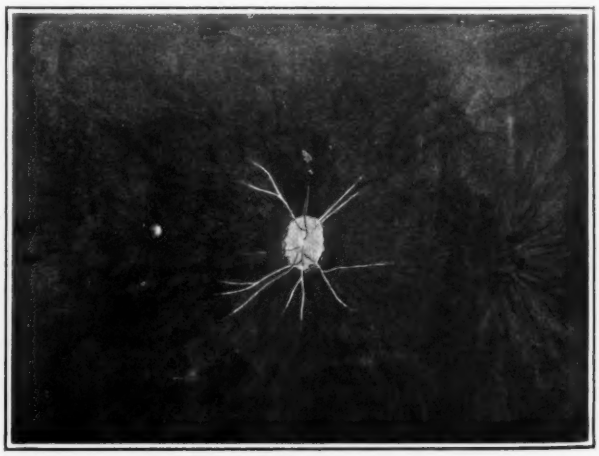

Fig. 7

Vascular changes due to direct injury to the eye. Obliteration of all the blood vessels resulting from direct blow at age of four years. Although patient is blind, tension is normal; media are clear. Patient, age 20. Case 1, Buffington.

EXTERNAL EXUDATIVE RETINITIS OR COATS' DISEASE

The discussion of the subject would not be complete without reference to that peculiar intra-ocular disease known as external exudative retinitis, or Coats' disease. It was in 1908 that Coats gave the world his splendid classic. The veil of mystery hides the cause now as when Coats made his vain but searching effort to find the hidden secret. Coats classified the cases into three distinct groups, as follows:

(1) Exudate without gross vascular changes (*Fig. 9*).
(2) Exudate with gross vascular changes (*Fig. 10*).
(3) Exudate with arteriovenous communication.

The disease usually shows massive exudate beneath the retinal blood vessels. The situation is in the outer layers of the retina, or the exudate may have broken through the outer limiting membrane to occupy the space between the retina and the choroid. Although it is between the two membranes, pathological studies show that the choroid is not primarily affected.

Coats believed that the massive exudate results from organization and degeneration of hemorrhages which ooze, so to speak, from the outer reticular layers into the subretinal space. Zentmayer,[23] in discussing his cases, states that the massive exudate results from extensive interretinal and subretinal hemorrhages. Collins,[24] in discussing formative fibrous tissue reaction in the eye, states that in this disease the hemorrhage first breaks up into debris, fibrin and cholesterin crystals, then follows a slow fibrous tissue organization. Verhoff, in discussing a case reported by De Schweinitz, says that after the histological study of a similar eye, he found occlusion of the central vessels by endovasculitis and degeneration of the retinal vessels. He considers the exudate a process of hyaline degeneration which follows tissue proliferation. To his mind, senile vascular sclerosis does not produce such tissue changes.

Fig. 8

Vascular changes due to direct injury to the eye. Central retinitis proliferans; extensive perivascular fibrosis (sheathing) of the retinal blood vessels; apparently the veins. These changes developed during three months following the accident. Patient, female, colored; good health; no evidence of vascular disease; Wassermann negative; spinal fluid, negative. Case 2, Buffington.

Fig. 9

Central massive external retinitis (Coats), without gross vascular changes: (1) slightly dilated veins passing over the exudate; (2) massive exudate; (3) dots of cholesterin crystals fringe the exudate; (4) edematous striae in surrounding retina. Patient, age 14, healthy, robust male. No cause found. Bywater: Tr. Oph. Soc. United Kingdom, v. 47, 1927.

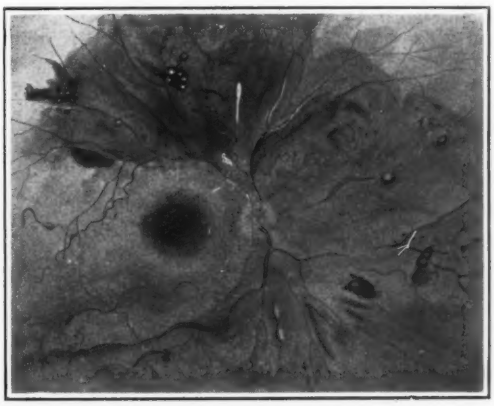

Fig. 10

Retinitis externa with massive exudate (Coats' disease) showing extensive exudate with all types of vascular changes, viz: fusiform, aneurysmal, and irregular dilatation. Condition is progressive. The eye was enucleated and the histological study made by Coats; one of the early cases reported by him. Complete pathological report has been made by Coats on this case. Patient, age 26, robust and healthy. Morton: Tr. Oph. Soc. United Kingdom, v. 28, 1908.

Friedenwald,[25] in the report of a series of cases, gives the pathological findings in one case as follows: although a massive exudate lay in front of it, the choroid showed but little pathological change. Retinal blood vessels were in a state of advanced degeneration. No retinal hemorrhages were to be seen. After a careful study it was not fully determined whether the mass as seen in the picture was neoplastic (angioma) or not. In the opinion of the pathologist it was an organizing inflammatory exudate.

Jervey,[26] in reporting five cases, ages from 15 to 55, discusses a type of exudative retinitis. The massive exudate may be within or without the retinal layer. Hemorrhages are not present. He uses the term "hyperplastic exudative retinitis, non-hemorrhagic." In his opinion this massive pathological tissue formation is a distinct entity which must be differentiated from lues, tuberculosis and traumatism, but which may produce retinal lesions resembling closely those caused by any one of the three diseases mentioned.

The characteristics of the disease as seen with the ophthalmoscope vary. There are usually some vitreous opacities which may be glistening particles (cholesterin crystals); massive exudates beneath the blood vessels; and visible hemorrhages may or may not be present. The vascular changes may be mild, limited to the loss of reflexes, dilatations, and constructions; or they may be fusiform or globular expansions, loops and glomeruli, and even new formed blood vessels. Finally, detachment of the retina occurs. The disease may remain quiescent for a long period of time, or rapid progression may occur, requiring excision of the eye because of pain.

Coats, Leber, and those who follow, agree that it is a distinct entity due to a primary disease of the retinal vascular system. Most observers agree that the exudate results from local hemorrhages. The etiology is unknown, but may be different in each case. The disease is often seen in very young children. In these, hemorrhages from birth injuries may play a part. In other children, whooping cough might be considered. Again, congenital alterations must be thought of. Tuberculosis and lues have been eliminated in practically all reported cases.

In older cases, Coats thinks alteration in the composition of the blood must not be ignored. After due consideration, H. Friedenwald concludes that the theory of local vascular disease is the most satisfactory. The report of three cases of Coats' disease follows. In two of these colored drawings of the fundus of the affected eyes are shown.

Case 1.—A boy, age 8, was healthy and well-developed. His family history was unimportant. Physical examinations were negative. The tonsils were removed. The Wassermann and other blood studies were negative. There was no evidence of tuberculosis.

Ocular History.—It was discovered at school that the child had poor vision in the right eye. He was first seen by me in June, 1924. Externally, the eyes appeared normal. There was binocular fixation. Vision in the right eye was 6/200; in the left, 20/20. Both pupils reacted equally. In the right eye were many shining vitreous opacities (cholesterin); the disc margins were indistinct. In the lower half of the fundus extending from the disc to the periphery was seen a grey-white opaque area beneath the retinal vessels. In some places the surface was white; in others it was mottled. The larger blood vessels were normal in size, but pale in color. The blood vessels stood out clear-cut and distinct on the solid grey-white and mottled background. The blood vessels in the periphery of the affected area were dilated with irregular caliber. Some hemorrhages were seen in the lower temporal periphery. The area was elevated three diopters (from notes made June 20, 1924). The left eye was perfectly normal.

February 20, 1926.—There has been very little change since the patient was first seen. The left eye remains normal.

December 28, 1926.—In the right eye, there is detachment of the whole lower half of the retina. The new-formed blood vessels are quite numerous. In addition to other vascular changes, the massive exudate now involves a considerable part of the upper retina. Tension is normal; his health, splendid. The right eye has no vision; vision in the left eye is 20/15.

December 27, 1927.—In the right eye light perception remains. The intra-ocular changes involve the whole retina. In the left eye vision is 20/15. The patient's general health is good.

February 1, 1928.—In the right eye the fundus is no longer visible because of the opaque lens. Tension is normal. A distinctive feature of the condition is that

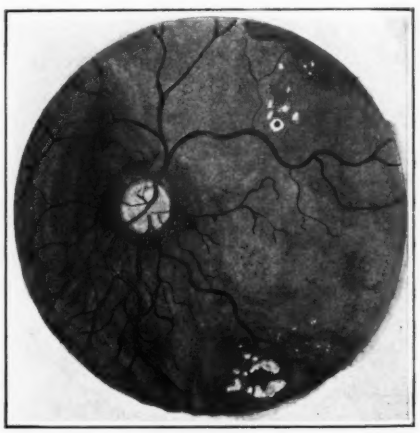

Fig. 11

Hyperplastic exudative retinitis, non-hemorrhagic (Jervey). Extensive greyish-white exudate in the temporal half of the retina, showing only slight vascular changes. The exudate is clearly located beneath the retinal blood vessels. Patient, male, age 64; bilateral; healthy; no evidence of disease of the vascular system. Case 2, Buffington, 1932.

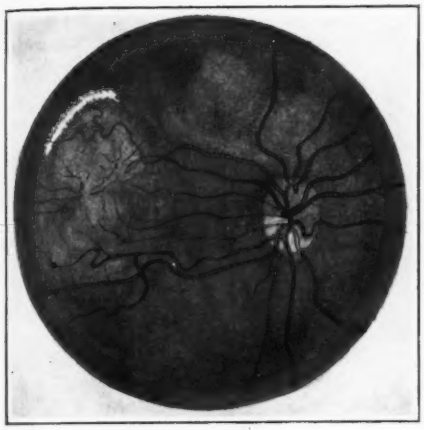

Fig. 12

Retinitis externa with massive exudate (Coats' disease). Central, oval-shaped, grey-brown area slightly elevated above the surrounding retina; a brilliant fringe along upper border (cholesterin crystals); rather extensive vascular changes confined to the diseased area. Patient, male, age 22; healthy. Case 3, Buffington, 1932.

there has never been any pain or discomfort. The vision of the left eye remains normal, 20/15.

The boy is now a healthy and robust youth of 17 years. The right eye gives no discomfort, although it is totally blind.

Case 2.—A man, age 64, was seen at Charity Hospital with poor vision in both eyes. He had external, non-hemorrhagic retinitis with massive exudate. The colored illustration shows the changes in one eye. There are minor vascular changes, but extensive exudates in the temporal half of the retina, clear'y beneath the retinal vessels. No hemorrhages are present. The patient was robust. There is no evidence of any disease of the vascular system. Both physical examinations and laboratory findings were normal. This case resembles closely those described by Jervey and termed by him "hyperplastic exudative retinitis, non-hemorrhagic" (*Fig. 11*).

Case 3.—In a man, age 22, vision in the right eye was failing. Left vision was poor, resulting from a birth injury. He was first seen in November, 1931. Vision in his right eye, corrected, was 20/100; left eye, corrected, 7/100. Vision of the right eye had been normal up to four or five years previously, with correcting lenses. In the right eye the iris was blue; in the left eye, the iris was dirty brown in color. Atrophy of the iris tissue was manifest. The pupils were dilated; the media were clear except for a few vitreous opacities. In the macula of the right eye is seen a blue, grey-white, oval-shaped, opaque area, slightly elevated above the surrounding retina. The margins are quite distinct. A cholesterin crystal border is above. The blood vessels run over the opaque area and end in the spot. The retinal vessels are dilated irregularly, and in places new-formed blood vessels are seen (*Fig. 12*). At first I was inclined to think the mass belonged to the grey colored retinal angiomas, but recent examination shows the area to be changing in size and growing smaller. I have classed this case as a central exudative retinitis with massive exudate, with vascular changes.

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DISCUSSION (*Abstract*)

Dr. S. Weizenblatt, Asheville, N. C.—The histological findings of Axenfeld, Meller and Gilbert in cases of recurrent hemorrhages in the vitreous brought forth pictures of typical tuberculous infiltrations of the retinal veins starting in the lymph-sheath, progressing towards the vein, and in the later stages perforating it. These infiltrations consist of lymphocytes; in the larger infiltrations, epithelioid cells and even giant cells with necrotic centers were found. These findings make tuberculosis an important etiological factor in recurrent hemorrhages of the vitreous. In some cases of retinitis hemorrhagica simulating the picture of a thrombosis of the central vein, Gilbert found a tuberculous infiltration around the central vein with resulting thrombosis.

XANTHOMATOSIS: WITH REPORT OF CASE*

By M. Toulmin Gaines, M.D.,
Mobile, Ala.

Xanthomatosis is generally classed as a rare disease, due in part to the failure of the profession, until recently, to recognize it.

It is rather surprising to find that a condition of its reputed rarity should have a voluminous literature, but this can be explained by noting that the literature embraces six entities which have comparatively recently been synthesized as various expressions of one condition and that only one of these is known as "essential xanthomatosis."

In a discussion of Dr. Sosman's[1] paper before the American Medical Association in 1931, Dr. Miliken mentioned that Broder lists 20 diagnoses ranging from giant cell sarcoma to mye-

*Read in Section on Dermatology and Syphilology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

loma, which were in his opinion xanthomatosis. In the case which I shall here report the number of diagnoses was commensurate with the number of physicians, mostly dermatologists, who saw the case in its earlier development.

I am inclined to believe, therefore, that many of us limit our acquaintance with xanthoma to xanthoma planum, tuberosum, diabeticorum and xanthelasma, and are not sufficiently conversant with the problems of xanthomatosis and its diverse manifestations. Dr. Weidman,[2] in 1927, in his "Studies in Hypercholesterolemia," said that "there is a large store of information concerning not only xanthoma, but xanthosis in general, which is more or less denied to the dermatologists because it is so widely scattered in literature." The xanthoma familiar to the dermatologist dates from Rayer's plaques jaunatres des paupieres in 1836, succeeded by the vitiligoidea of Addison and Gull, 1852, the xanthelasma of Erasmus Wilson, 1863, and finally known as xanthoma in 1869.

Pollitzer and Wile, in 1912, held that xanthoma palpebrarum did not belong to the general xanthomatosis group, but Dr. Bruno Bloch and others have recently stated it to be a manifestation of the same condition. Dr. Weidman, in 1927, included it when he characterized them as "various expressions of the process which have additional features that make them clinical entities."

The six entities enumerated by Sosman are Gaucher's disease, Niemann-Pick's disease, Schuller-Christian's disease, Tay-Sachs' disease, the xanthomas of jaundice, diabetes, and pregnancy, and essential xanthomatosis.

"Gaucher's disease involves chiefly the spleen, occurs at any age, but most frequently in female children, is familial and fairly benign. Niemann-Pick's disease shows marked enlargement of liver and spleen, is racial, occurs almost exclusively in infants of the Jewish race, and is rapidly fatal.

"Schuller-Christian's disease occurs chiefly in children, characterized by involvement of bones of the skull, occasionally other bones, with frequent association of diabetis insipidus, exophthalmos, gingivitis, jaundice and abnormalities of growth, is fatal in a third of cases.

"The Tay-Sachs type is known as amaurotic familial idiocy.

"The other two types, namely, the xanthomas of jaundice, diabetes and pregnancy and the essential xanthomatosis are characterized by cutaneous or mesenchymal deposits of lipoids, frequently in tendons or tendon sheaths, with or without diabetes, jaundice or pregnancy, are not racial or familial and are quite benign."

As the word xanthoma simply means a yellow tumor the term xanthomatosis gives no suggestion of the common factor in these varied conditions. The word lipoidosis is not only expressive of the etiology, but is inclusive enough to cover the chaotic theories concerning the metabolic disturbance and the histopathology involved.

Before we take up a brief review of this condition let us refresh our memory with a few facts in organic chemistry.[3]

The lipids comprise (a) the true fats, (b) the lipoids that are chemically similar to fats, and (c) the sterols which are physically but not chemically similar to fats.

An ester is an organic salt. Fats are esters of fatty acids and alcohol. Glycerol is a triatomic alcohol and combined with tripalmitic, tristearic, or trioleic acid forms the storage or depot fat of the body.[1]

The lipoids include (1) the phosphatids or phospholipids which are fatty acids with a nitrogenous radicle and a phosphorus radicle. Lecithin belongs to this group and is found in growing tissue and in nervous tissue. (2) The cerebrosides which are fatty acids with no phosphorus, but a glucide group, and are therefore also called glycolipids.

Included with the lipoids because of their physical resemblance in spite of their chemical differences are the sterols which, as their name implies, are alcohols solid at ordinary temperatures.

Phytosterol occurs in plant life; cholesterol in animal life, and it is of exogenous and endogenous origin. Concerning its endogenous origin, there are many conflicting theories involving, respectively, action of the liver, pancreas, spleen, and so on. It is universally present in all cells of the body. The cholesterol content of the blood is increased by a diet rich in lipoids, by pregnancy, and by certain diseases: diabetes, arteriosclerosis, and nephritis. The normal cholesterol value is 130 to 170 mg. per 100 c. c. of blood. Cholesterol is a monatomic secondary alcohol and may combine with a fatty acid to form an ester, that is, a lipoid.

Most fat solvents such as choloroform, or ether, will also dissolve cholesterol. Acetone will dissolve cholesterol, but not fats.

Cholesterol is insoluble in water, acids and alkalies, but is soluble in the bile salts, in fluid fat, and slightly soluble in soap solutions. It is not saponifiable. It checks the action of lipolytic enzymes. The cholesterol content of the blood runs parallel with its fatty acid content

and is therefore an index of the extent of lipemia in diabetes.

The above salient points are sufficient for an understanding of the theories concerning xanthomatosis.

Sosman sums up the condition by saying that the common etiologic factor is a disturbance of lipoid metabolism or of lipoid excretion resulting in storage of various forms of lipoid in the organs and tissues of the patient. The storage is either widespread and diffuse or localized in granulomatous deposits.

While the limits of this paper preclude anything more than a superficial survey, I shall begin not with the proof of the presence of cholesterol in 1908 by Pinkus and Pick, but with the contribution of Harrison and Whitfield[4] in 1923, because, although their theory is modified by modern findings, it serves as a basis of comparison and also presents pathological findings whose accordance with present day theories are of significance. Their conclusions were that xanthomatosis is probably a process of infiltration dependent primarily on hypercholesterolemia, and secondly upon the duration of the blood condition, local trauma and local vascular supply; that it was a process of cell senescence and death, arrested before chemical change is complete enough for absorption. Arrest leads to deposit of cholesterin esters. Slight irritation or inflammation causes aggregation of cells and this results in increased deposit of cholesterin esters. They believed that the hypercholesteremia is a part of a disturbance of fat metabolism resulting probably from pancreatic disease.

In 1928, Rowland[5] said that xanthomatosis represents the body's attempt to rid the body fluids of lipoid which cannot be properly excreted and which acts as an irritant; and it is characterized by two processes: lipoid storage and connective tissue cell proliferation. He compared the cholesterol deposits to the tophi or gout, saying that xanthoma is to hypercholesteremia as tophi to gout. He said that lipoid gout was a diet disease and not a rare condition. His statement that hyperlipoidemia, especially hypercholesteremia, is now generally regarded as the most common fundamental cause of xanthoma, has since been modified by Epstein and Lorenz, quoted by Sosman as follows:

In Gaucher's disease the lipoids were found to be cerebrosides (glycolipids).

In Niemann-Pick's disease they were the phosphatids (phospholipids).

In Schuller-Christian's disease (especially investigated by Rowland) the predominant lipids were cholesterol and its esters.

In the xanthomas and in essential xanthomatosis there is found a complex group of lipoids of variable percentage usually in part at least of cholesterol and its esters. It has therefore been called a mixed steatosis.

The following points are made by Rowland:

Cholesterolemia may be considerable and not cause xanthomatosis. In a case of xanthomatosis where the two brothers of the patient had 175 mg. and 272 mg. per 100 c. c. of blood cholesterol content was 397 mg. per 100 c. c. of blood without any symptoms of xanthomatosis. There is no parallelism between cholesterol content of the blood and xanthomatosis. Increase of cholesterol is shown in the chemical content of lesions. Hypercholesterolemia, however transient, provokes lipoid storage. Cholesterolemia may result in gallstones or in atheroma or in xanthoma. The local lesions of xanthomatosis are the result of trauma and friction.

He describes the histopathology as follows: the xanthoma cell is a cell of reticulo-endothelial origin infiltrated with lipoids. Xanthoma lesions are hyperplastic reactions of the reticulo-endothelial system resulting from infiltration of lipoids in excess in the body fluids. A localization of the process produces hyperplastic nodular lesions. These lipoids, acting as foreign bodies, cause irritation of the intima, break through the capillary walls, are taken up by the reticulo-endothelial phagocytes and conveyed to the point of deposit which is determined by trauma or inflammation, or also, as pointed out by Wile, to areas subjected to tension.

I will add here a few lines from text-books on this subject:

"At the present time there is considerable evidence to suggest that cholesterol metabolism is regulated by the activity of the reticulo-endothelial system rather than by that of any one organ. There are two hypotheses: one that the reticulo-endothelial cells control the normal disposition of lipoids, removing cholesterol from the blood when it is in excess and returning it to the blood when the concentration is low. The other is that the reticulo-endothelial system synthesizes cholesterol and that variations in the concentration of this substance in the blood are due to its variable synthesis by the reticulo-endothelial system. The first hypothesis is more in accord with Rowland's theories.

"The so-called foam cell is due to dissolving out of the lipoid infiltrate during laboratory work, and those with spindle cells and connective tissue, together with increased vascularity, make up the early forms of xanthoma nodules. Later the vascular supply is limited; there are no lipoid containing cells, only fibrous tissue and cellular reaction."

The point has been made that if the nodules were the result of local lipoid deposit the lipid substance would be centrally located, whereas if the nodule is the result of cell carriage from the vessel walls we should find lipoid containing cells about the vessels and outside of the nodules.

Although Harrison and Whitfield advance the theory of local deposit through cell senescence and death with the liberation of cholesterol, it is of interest to notice how their excellent histo-

pathologic picture accords with these later theories. Their report in part says:

"The tissues around the nodules show vessels with accumulation of clasping cells and some proliferation of endothelium. Many cells far away from the xanthomatous lesions show the sudanophilous droplets in the endothelium and the clasping cells."

In 1927, Dr. Weidman[6] said: "Some factor in addition to the mere presence of hypercholesteremia and young connective tissue cells is necessary to the development of xanthoma tuberosum."

In 1929, Dr. Udo Wile[7] recorded these conclusions: that since a chemical analysis of xanthomatous lesions shows an excess of fatty substances other than cholesterol which occurs as 16 per cent of the lipids present, and since xanthomatous lesions frequently occur in the absence of high cholesterol values in the blood, the lesions of xanthoma do not appear to be due primarily to cholesterol. This substance appears in such lesions in a normal value with increasing amounts of other lipids. The high cholesterol content of the blood in the lipemia of diabetes is an associated factor of the disordered fat metabolism and not the primary cause of the xanthomatous lesion.

In commenting on this Dr. Weidman agreed with the conclusions and said that in xanthomatous lesions there should now be demonstrated lipoid tophi rather than cholesterol tophi.

In 1931, Bruno Bloch[8] came to a similar conclusion concerning the cholesterol content of the blood and its relation to xanthoma deposits. He says that a determination of the cholesterol content of the blood is without value, but that the amount relative to other lipids is important if made by reliable tests.

In a series of cases of xanthomatosis he found the cholesterol content normal in 19.85 per cent, reduced in 8.82 per cent, and increased in 71.33 per cent.

Analysis of what he calls the lipid system in normal blood showed:

Cholesterol, 110 to 150 mg. per 100 c. c. of blood.
Phosphatids, 200 to 250 mg. per 100 c. c. of blood.
Neutral fats, 400 mg. per 100 c. c. of blood.

Most important of all, he holds that the total cholesterol of the blood consists of about 70 per cent of cholesterol esters and about 30 per cent of free cholesterol, and that an alteration of this normal ratio results in a disturbance of the equilibrium of the lipid emulsion.

He suggests that alteration of the normal proportion between the individual lipid constituents and between the albumin of the serum will result, according to the laws of the colloid theory, in a disturbance of the stable aqueous lipid emulsion which represents the serum; the particles becoming larger and coarser and the emulsion separated, resulting in a precipitation of xanthoma formation.

He, therefore, considers xanthoma a result of the derangement of the ratio of the lipid contents of the blood and tissue, which does not occur when there is a proportional increase or decrease of the lipids.

There are many pathways leading from the subject of xanthoma, some of which have been barely entered, some we have been forced to pass by and all of which lead into almost inextricable mazes of investigation and speculation. The various theories of the origin of cholesterol, from the liver, the pancreas, the spleen, the reticulo-endothelium; the function of cholesterol; the laws governing surface tension and adsorption; the digestion of fat, its absorption by being split up in the intestine and resynthesized in the epithelium of its villi; the short cut to the blood stream by which the fat-laden blood evades the liver; whether the so-called cholesterophilia of the tissues is actual or fanciful; the relation of hypercholesterolemia to atheroma, nephritis, jaundice and especially diabetes; its relation to pituitary dysfunction: all of these are more or less tangled trails which need to be converted into plain paths before we can claim a complete understanding of xanthomatosis.

In the case that I wish to report I feel there is now no question as to the correctness of the diagnosis, and that it presents several unique features.

CASE REPORT

C. A. V., age 47, a white man, native of Illinois, was by occupation a truck farmer.

His father was living, age 76; his mother was living, age 76; and both were in good health. One brother, age 43, was living and in good health. One sister was age 51. Her physical health has always been good; recently she had a mental break-down, from which she seemed to be recovering. One brother died in childbirth.

For some years prior to the first illness the patient had been engaged continuously in the use of dusts and sprays containing arsenic as his part of the farm work.

He was especially fond of sweets, which comprised a large portion of his food.

In August, 1928, he had a severe itching without visible lesions. This lasted into the next month, when the neck became red and successive crops of small blisters appeared, which dried up and healed without scarring. This itching lasted until the onset of cold weather in December. Toward the latter part of the month small nodules began to appear on the hands and on the rim of the ears.

During the following month, January, 1929, he began losing weight. In February, nodules appeared on the forehead, bridge of the nose, and below the inner canthus of each eye. In March, he began to have stiff-

ness of the finger joints and later of the elbows, knees and legs. About the middle of the month he began to have pains in the knees and later in the hands and arms. In April, the pain began to be very severe in his neck, arms, and hands. He was treated by a physician who still adheres to his original diagnosis of arthritis deformans. In May, large nodules began to appear on the back and elbows. He consulted Dr. Ely, of Moss Point, Mississippi, who referred him to us.

In June, 1929, the patient was first seen by us. He was thin, weak, and able to walk only with greatest difficulty owing to stiffness in the knees and stiffness and contraction of the toes. His expression was anxious, but he was not suffering any pain (*Fig. 1*).

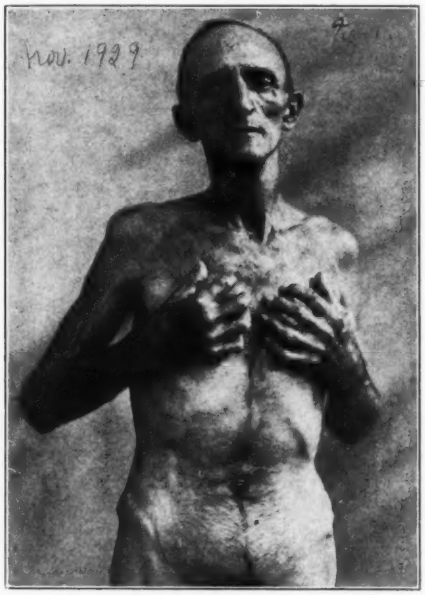

Fig. 1

There were small reddish-brown, translucent nodules about the forehead, nose, and face near the inner corner of each eye.

On the elbows and on the back over some of the vertebral processes and about the hips and shoulder blades there were large doughy nodules covered with normal skin. Over the right shoulder blade the skin was loose and doughy and thick. The patient said the nodule in that region had been larger, but had lately diminished in size.

There were bluish areas of congested but otherwise normal skin (*Fig. 2*) over the right shoulder, scapula, and right side of the chest.

On the back of the right arm near the shoulder to the elbow was a raised thickened area made up of a coalescence of dark purplish-blue papules (*Fig. 3*). Because of this area my diagnosis was Kaposi's multiple hemorrhagic sarcoma. My confrere, Dr. Cogburn, concurred in the opinion that the case belonged in the

Fig. 2

Fig. 3

lymphoblastoma group. The patient was put on sodium arsenate 2 parts, phenol 2 parts, distil'ed water to 100, dose 0.5 c. c. hypodermically, increasing the daily dose 0.1 c. c. until a 3 c. c. dose was reached and then diminishing in the same ratio.

August 22, one skin unit of unfiltered x-ray was used on the back of the right hand. An x-ray of the trunk showed chest negative. No enlargement of liver or spleen. No bone changes were noted.

October 2, biopsy was made and the section showed connective tissue infiltration with many giant cells. This was interpreted by us as confirmation of the diagnosis of lymphoblastoma.

October 22, two skin units of filtered x-ray were given back of the left hand. The patient had gained weight (6 pounds) and strength; swelling of the feet had subsided and stiffness of the toes had subsided sufficiently to permit him to walk much better. He had taken two series of treatments. The nodules on the shoulders had disappeared; those on the back and elbows had regressed. The purple papules on the back of the right arm had entirely disappeared. The nodules on the face and ears remained the same; those on the knuckles increased in size (*Fig. 4*). Other nodules of the reddish-brown, translucent type appeared along the forearms and flattened nodules appeared in the palms of the hands.

Fig. 4

November 5, the patient was presented before the Louisiana Dermatological Association. One prominent dermatologist concurred in our diagnosis of multiple sarcomatosis, while another leaned strongly toward a diagnosis of leprosy, in which another concurred after first inclining toward the sarcoma diagnosis. This diagnosis of leprosy was based on the contraction of the hands, which simulated the well-known *main en griff*.

Biopsis taken from the ear, thumb, forearm and back all showed many giant cells and a histologic picture at first interpreted as sarcoma, but afterwards pronounced by Dr. John Lanford xanthoma tuberosum. His report is appended to this paper.

November 14, biopsy was made and a specimen sent to Dr. O. E. Denny, of the U. S. Leprosarium at Carville, Louisiana. He reported that the tissues showed no histologic or bacteriologic evidence of leprosy.

November 14, two units of filtered x-ray were given to the backs of both hands.

At the Miami meeting of the Southern Medical Association I showed an enlargement of a photomicrograph of Dr. Lanford's slide to Dr. Udo Wile, who said the condition was xanthoma.

In the spring of 1930 I visited the patient and put him on a diet excluding all starches and sugars. An effort was made to hospitalize him, but failed, possibly owing to the suspicion of leprosy. For the same reason he suspended communication with me and as he lived fifty miles from me, I saw him at infrequent intervals until the latter part of 1931. At each of these visits I noticed the fingers becoming shorter and more flexible. Most of the large nodules about the back and hips disappeared. There was loud crepitation in his knee joints when he stood and flexed them, the sound being heard at some distance. This has since disappeared. There was no xanthelasma. This picture was seen by Dr. Denny, who said it did not look like the hand of leprosy (*Fig. 5*).

Fig. 5

In April, 1932, I saw the patient with Dr. A. B. Cannon. His condition was as I have described with the addition of a marked xanthelasma of both upper lids. The forehead was orange colored, as was the skin over the upper part of the chest below the clavicle. This discoloration is made up of minute orange colored papules.

I last saw this patient the second day of this month, at which time the tests were made which I am presenting with this report, and the x-rays and photographs were made. The yellow discoloration on the forehead has nearly disappeared. The patient's complexion is rather florid, his face is filled out and expression improved. New nodules have appeared, several the size of marbles of a deep purple color on his left thigh near the upper part. He has a scattered group of well defined translucent bronze papules, pin head in size, on the anterior surface of the right thigh.

His neck is stiff and muscles on the left side seem very rigid, though a swelling on this side has subsided somewhat in the past few months. He is able to stand and take a few steps with much difficulty and is easily tired by any exertion. His appetite is good and his morale excellent. The patient says he improved on the non-carbohydrate diet and even more so after meat was excluded. After adding whole wheat bread to his

daily diet he says he noticed a recurrence of some of the nodules and papules.

I am appending complete reports of the histopathologic structure of the nodules by Dr. John Lanford, of Touro Infirmary, New Orleans, and by Dr. Machacek, of New York; a'so an interpretation of the x-ray films by Dr. Hannon, an orthopedist, and Dr. Gravelee, of the Mobile Infirmary.

The blood examination can be summarized by noting the normal count and differential, the normal non-protein nitrogen, uric acid, and creatinine: the slight increase of sugar and the increase of cholesterol in the whole blood. The sugar tolerance curve was high, 189 mg. at 45 minutes.

Urine was negative for sugar, cel's and casts. There was a trace of albumin; specific gravity was 10.11 and acid reaction.

The basal metabolic rate was plus 13. The Wassermann and Kahn were negative.

Dr. Jeffries C. Michael, who is carrying on a series of blood examinations of these cases with especial reference to the Bloch theories, kindly sent me a preliminary report on the blood of this case. He notes that the cholesterol-ester:free-cholesterol ratio is definite'y corroborative of Bloch's theories. I am showing a slide giving his findings in the blood serum with the normals in quantity and percentage as quoted above from Bloch.

SUMMARY OF X-RAY REPORT

The heads of the humeri show marked atrophy and a cystic formation which has produced almost complete destruction. The proximal and distal ends of the clavicle are absent.

Both femur heads are complete'y destroyed to the intertrochanteric line. There is extensive destruction of the sacrum and of the fifth lumbar vertebra with wedging of its body.

The shafts of the femur and tibiae show extensive cortical destruction; the joint space is practically obliterated and the articular surfaces are irregularly destroyed. The patellae are displaced laterally with detail lost by destruction.

The terminal and middle phalanges of all the fingers are destroyed, the proximal to a less degree. The distal ends of the metacarpals except the thumbs are destroyed. The carpa's are absent. The heads of the radii and distal end of the ulnas show large areas of destruction. The metacarpals of the thumbs show slight involvement. The involvement of the hands is symmetrical with no attempt at repair.

SUMMARY OF DR. LANFORD'S REPORT (1929)

"There is a structure infiltrating the several layers of the skin and encroaching upon the stratified squamous layer. The component cells have a prominent nucleus and nucleolus. Their cytoplasm varies considerably in size and shape, is slightly granular and presents a number of areas of vacuolation, the so-called foam cells. The supportive structure of the skin is destroyed, many remnants of collagen fibers being demonstrated. There are a number of multinucleated cel's with the nuclei arranged around the periphery in the shape of a circle or a horseshoe. The blood vessels are not prominent, but sufficient to maintain nutrition. In the absence of active inflammation or evidences of a neoplasm of a fibroblastic, neurogenic or epithelial character, with the fact that there are many embryonal fat cells, some of which are definitely forming fat g'obules, I am forced to the conclusion that the condition is xanthoma tuberosum (*Fig. 6*).

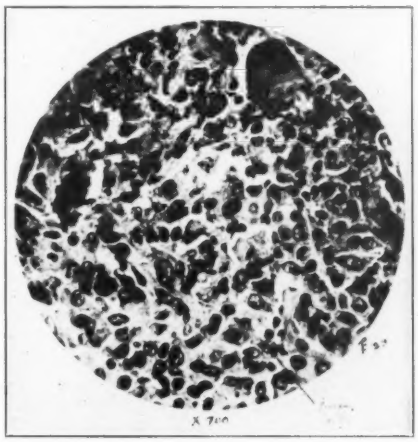

Fig. 6

SUMMARY OF DR. MACHACEK'S REPORT (1931)

The surface epithelium is edematous, shows slight keratosis, rete pegs are practically absent. Superficially there is a chronic inflammatory reaction. The vessels are increased in number and size, the deeper ones showing marked thickening of the walls with a swollen endothelium. About these is a definite proliferation of cells, mostly spindle-shaped. The larger vessels deep in the corium show a marked proliferation of elongated cells which protrude into the lumen. Large mononuclear cells with a pale pink protoplasm are seen; the nuclei large and vesicular, the nucleoli prominent. There are many multinuclear cells which vary greatly in size; these have peripherally arranged vesicular nuclei with prominent nucleoli. Fat stains disclose no lipoid content. Nerve stains show very few nerves. Reticular stains seem to indicate that the cells of the corium are mesodermal. The most likely diagnosis in spite of the absence of lipoid content is xanthoma tuberosum.

SUMMARY OF DR. J. C. MICHAEL'S REPORT

Lipids	Patient	Normal
Total fat	1440	800
Total cholesterol	313	150
Cholesterol esters	139 (44.5 per cent)	105 (70 per cent)
Free cholesterol	174 (55.5 per cent)	45 (30 per cent)

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DISCUSSION (*Abstract*)

Dr. H. F. Anderson, Washington, D. C.—Formerly we were content with the explanation that in xanthoma a faulty metabolism of cholesterol resulted in cholesterinemia and local deposits which were always yellow either as plaques or nodules. We called them xanthomata and they had a more or less characteristic histological picture.

Since the investigations of Weidman, Wile, Bruno Bloch and others we know that other fatty substances than cholesterin are just as significant in the production of these tumors. There are diseases in which the cholesterol of the blood is well above 130 to 170 mg. with no resultant xanthoma formation. Probably inhibition of lypolytic enzyme action together with some changes in the cells themselves as explained by Bloch is responsible for these formations. These newer observations have led us far toward intelligent therapy. Some cases yield to a low carbohydrate diet, some to fat-free diet, and insulin therapy has been effective occasionally in the non-diabetic type. However, some cases are still found that apparently respond to no type of therapy. Such a case has recently been under our observation. A young man of about 30 with many typical yellow tumors on all extensor surfaces whose blood repeatedly showed normal sugar and high cholesterol fats and fatty acids failed to show more than slight and temporary improvement on sugar-free diet, insulin, fat-free diets, electro-desiccation and all therapeutic measures known to us.

Dr. Gaines' case could very easily be mistaken for leprosy, sarcoid or the lymphoblastomata. Aside from the orthopedic symptoms this case is similar in some respects to a case from Rheil's Clinic in Vienna which was demonstrated before the International Congress and has been widely advertised in the literature. The patient lay in the Algeneine Spital for some years with a new diagnosis at more or less regular intervals until some enterprising person, after noticing a few yellowish spots, removed one of the many bluish red nodules about the size of a robbin's egg, with which the patient was literally covered, and ran a Sudan III stain. Foam cells and xanthoma architecture were found and a diagnosis made of tuberoserpigenous xanthoma areotaris of Rheil.

We have observed one case of large bluish red tumors in a child which started soon after birth, was treated with massive doses of radium and x-ray after a diagnosis of sarcoma cutis at a meeting of the American Dermatological Association, that later proved to be xanthomatosis.

All this brings to mind the fact that all xanthomata are not of the characteristic yellow type. If special fat stains are made, and the probability of xanthoma kept in mind in cases of tumors or nodules simulating the lymphoblastomata, leprosy or sarcoid that do not by histological structure fit definitely into the shelves of these diseases, more diagnoses of these unusual xanthomata will be reported.

Dr. Fred D. Weidman, Philadelphia, Pa.—The involvement of the bone marrow puts this case very much out of the ordinary and recalls Pick's two cases of Gaucher's disease in which there were xanthomatoid changes. I feel personally that Dr. Gaines' case is also one of Gaucher's disease. The beautiful photomicrograph did not show good xanthoma cells, and it is probable that the particular portion of material selected for microscopic examination came from some portion of a bone "neoplasm" which had not as yet undergone secondary xanthomatous change. I feel that the way is still open to show that some cases of Christian's disease and Gaucher's disease are instances of multiple myeloma or analogous disease, now of perhaps plasma cell type, now of "lymphoid" type, in which more or less fortuitously there has been an associated hypercholesteremia or other factors to determine a secondary xanthomatosis. Herzenberg's case of "the skeletal form of Niemann-Pick's disease" is in point, although Rowland included it in his compilation of cases of Christian's disease. Along the same lines, Freeman and I felt that the osseous changes were referable to an underlying granulomatous condition in which secondary xanthomatous changes had taken place, an opinion which Rowland did not acquiesce in. He classified our case as one of Christian's disease.

Dr. Anderson's remarks confirm an opinion which I have entertained for a long time, namely, that whereas we have for a long time known only four kinds of xanthomas, the list is bound to be greatly extended. Heretofore xanthoma tuberosum, xanthoma planum, xanthoma in tumors, and xanthoma diabeticorum were the only ones on the list. I have seen, however, xanthomatous changes in a nevus, and there are cases on record where xanthomatous changes have occurred in carcinomas of the prostate and of the stomach. Whereas it is good policy to avoid complicating dermatological nomenclature, it seems inevitable that the list of forms of xanthomatosis will eventually be greatly extended.

We need more and more cases like this of Dr. Gaines to emphasize to us that the spectacular yellowness and other features of xanthoma may be but smoke screens which are disguising fundamental disease states in the skin which are far more important than the xanthomatosis to the welfare of the individual, and toward which dermatologists owe a larger responsibility.

Dr. John A. Lanford, New Orleans, La.—I can add nothing except to say that the presence of foam cells, giant cells and the absence of any evidences of neoplasm or inflammation made me feel sure of the diagnosis of xanthoma.

PRIMARY MALIGNANT TUMORS OF THE URETERS*

By I. G. DUNCAN, M.D., B.S., F.A.C.S., Memphis, Tenn.

Primary malignant tumors of the ureters are most rare. The first case was reported by Rayer in 1849, and a careful search of the literature shows only 50 cases reported up to the present time. The case which I am presenting makes the fifty-first. A number of these tumors were situated so near either to the kidney or the bladder that there may be some doubt as to whether or not they were primary growths of the ureters. Rousselot and Lamon published a very complete synopsis of 49 cases and added the fiftieth one in 1930.

These tumors are most malignant and only one case reported was alive 2½ years after diagnosis.

Etiology.—This disease seldom occurs before the age of fifty, and seems to be slightly more prevalent in the male than in the female. Stricture, malformation, diverticula and stones are supposed to be predisposing causes.

Pathology.—The tumors may be of connective tissue or epithelium. The sarcoma is of the connective tissue type, and 5 cases have been found.

The epithelial or cancer type may be papillary or non-papillary. The latter group includes medullary and squamous cell carcinoma. The papillary carcinoma is the one found most often.

The ureteral wall at the site of the tumor becomes dilated. If the ureter is plugged suddenly, the kidney may appear almost normal. However, if it be a gradual process a hydronephrosis will be produced. If infection takes place within this hydronephrosis, a pyonephrosis may develop.

These tumors tend to metastasize early. This may take place in the following ways: (1) venous system, (2) lymphatic, (3) to the adjacent organ by continuity of tissue, (4) by implants to the lower ureter and bladder.

Signs and Symptoms.—The signs and symptoms of ureteral tumors are the same as those of kidney tumors, namely: (1) hematuria, (2) pain, (3) tumor, and (4) disturbance in the genito-urinary tract.

Hematuria is the most constant symptom, being present in about 85 per cent of the cases. It may consist of only a few blood cells in the urine, or it may be so severe that the patient's life is endangered.

The pain also varies greatly in its severity. It may be only a dull ache, or may be so great as to simulate a renal colic. It may radiate from the lumbar region down into the genitals, or down the leg, or it may remain in a fixed area in some portion of the ureter.

If a marked hydronephrosis be present a tumor may be palpated. Otherwise, no mass can be felt.

The majority of these patients become infected, so more or less urinary disturbance is present.

DIAGNOSIS

In former days, before complete cystoscopic examination could be made, about 90 per cent of these tumors were diagnosed either at operation or autopsy. They were very rarely suspected earlier. However, with our modern x-ray equipment and much improved cystoscopic methods, these tumors should seldom be overlooked. The patients give a history of pain and hemorrhage, which cause us to suspect a tumor of the genito-urinary tract. X-ray of the kidneys, ureters and bladder is negative for stones. Cystoscopic examination may show blood coming from the affected ureter. If a catheter is passed up the bleeding side to the kidney and clear urine is obtained, it is very suggestive of a tumor of the ureter. If a pyelo-ureterogram should show a filling defect in the ureter with nothing in the pelvis to account for the hematuria, this is most suggestive of a ureteral tumor. Intravenous pyelography is of great value. In tumors of the papillary type situated in the lower ureter a portion may be seen protruding from the orifice.

Prognosis.—As was mentioned above, these tumors metastasize early and extensively. The most frequent sites are the lungs, deep and superficial lymphatics, liver and bones. Only one patient lived 2½ years after diagnosis.

Treatment.—Nephrectomy and ureterectomy should be done at the earliest possible opportunity. Deep x-ray therapy may be given following the operation or in inoperable cases.

CASE REPORT

Mr. A., a white man, age 58 years, came to our office October 30, 1931. His chief complaints were (1)

*Read in Section on Urology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

Fig. 1
Ureterogram showing fusiform enlargement of left ureter.

hematuria, (2) a dull aching pain in the flank and lower lumbar region, (3) weakness and shortness of breath.

The family history was negative. The venereal history was negative. With the exception of a few malarial chills he had been well until six years previously, when he had an attack of cholecystitis accompanied by a digestive disturbance. Two years ago he had an attack of renal colic with hematuria. Although a picture was negative, he was advised that the trouble was due to a stone in his kidney. This attack lasted for about a week. One year ago he had a similar attack and the hematuria lasted for three weeks. Again the x-ray was negative for stones. He did not recuperate rapidly following this attack. He felt weak, coughed a great deal and became short of breath upon exertion. He also noticed a slight hematuria from time to time. He began to have frequency and painful urination with nocturia three to four times.

Three weeks before our examination he was taken with an acute renal colic, followed by a profuse hematuria. He was given morphine to relieve the pain and hemostatic serum to control the hemorrhage. After about a week the acuteness of the attack subsided and he was left with a dull aching pain in the left flank corresponding to McBurney's point on the right side. The hematuria persisted. Some dysuria and nocturia are present. He coughed a great deal, especially at night. He slept poorly and at times was very short of breath.

Examination showed a stocky, well built and fairly well nourished man, rather pale and apparently anemic. The head was negative; the teeth and tonsils were negative. The neck showed enlarged cervical lymph nodes about the size of a grape. In the chest, numerous rales of all kinds were present with slight bronchial breathing in some areas. The heart was very large and somewhat irregular. No murmur could be heard. In the abdomen, no tumor mass could be felt, but the patient was quite tender over the left flank, corresponding to McBurney's point on the right side. His blood pressure was 140/120. His prostate was somewhat enlarged and tender, but there was no evidence of malignancy. His blood count was about normal with 65 per cent hemoglobin. The Wassermann test was negative.

Urinalysis showed a urine thick with blood and containing 10 to 20 pus cells to the high power field, specific gravity 1.025, 2 plus albumin, and no sugar.

Non-protein nitrogen was 40.

X-rays of the kidneys, ureters and bladder were negative for stones.

X-ray of the chest showed a widening of the upper mediastinum. The widening is symmetrical and the borders are circumscribed. The mass appears to be separated from the aorta. There is general peribronchial thickening with an occasional calcified node. The apices are clear and the diaphragm smooth and regular. The heart appears definitely enlarged.

Cystoscopic examination showed a somewhat enlarged prostate with a moderate median bar. There were no stones or tumors in the bladder. A blood clot was seen protruding from the left ureteral orifice. A catheter passed up the right side without difficulty, while that on the left met an obstruction about three inches above the bladder, which it would not pass. Indigo-carmine intravenously showed a normal function upon the right side with no function at all upon the left.

Fig. 2
Horseshoe shape bend of ureter with kinking and papillary tumor protruding from mucosa which occupied the expanded portion of ureter. Smaller papilloma near end of same portion of ureter.

Fig. 3
Photomicrograph showing stratified papillary malignant epithelium of mucosal surface (low power).

A pyelogram of the left side with the patient's head lowered showed that no media had passed the obstruction. There was a marked filling defect in the ureter about three inches above the bladder.

Intravenous urography showed a normal right kidney and ureter, but did not outline the ureter at all upon the left side.

We made a diagnosis of tumor of the ureter but, of course, could not say whether it was primary or secondary to a tumor of the kidney.

Operation was advised and accepted. The preoperative preparation consisted of rest, forced fluids, alkalies and digitalis.

On October 13, 1931, the patient was operated upon under spinal anesthesia. The kidney and upper ureter appeared about normal. However, a fusiform enlargement about the size and shape of a carrot was found in the lower third of the ureter. A nephrectomy and ureterectomy were done.

The first few days after operation were rather stormy. After this, recovery was uneventful and the patient left the hospital on the eleventh postoperative day. He went home and thereafter was under the care of Dr. W. H. Gragg. He did very well for a short time, but died as a result of metastasis several months later.

Gross Pathology.—The specimen consists of the kidney and ureter. Midway of the ureter is a fusiform thickened dilated portion. When it was opened there escaped old clotted blood and a small amount of bloody mucoid material. There is attached to the lining an oval, lobulated, grayish, slightly necrotic mass attached by a small pedicle 2 cm. in length and 1 cm. in thickness. There is also another smaller mass high up attached to the dilated ureter by a rather broad base. Both tumors are papillomatous and cause obstruction and dilatation of the ureter.

The kidney is slightly larger than normal. The pelvis is dilated. The medullary portion is narrowed. The calices are reddened.

Microscopic Pathology.—Section from the larger tumor shows a papillomatous arrangement of the lining and epithelial cells in large masses, with small round cell infiltration. There are also masses of infiltrating tumor cells rich in mitoses. These are regarded as locally malignant because of the infiltration.

There are several veins filled with tumor cells. Abnormal mitoses are present. Transition from benign papilloma to malignant growth is fairly definite. A

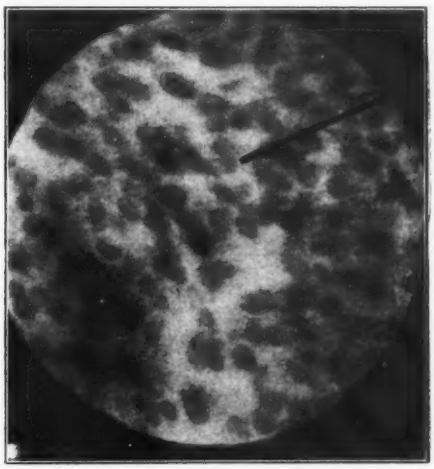

Fig. 4
Photomicrograph (high power) showing medullary character of tumor.

Fig. 5
Photomicrograph (high power) showing abnormal mitoses in tumor.

section from the base of the smaller papilloma is benign, but similar to the larger one in arrangement.

Section of the kidney shows a chronic infective reaction of the polymorphonuclears, round cells and fibrosis adjacent to the pelvis.

Section from the cortex shows glomerular nuclei concentration and capsular space obliteration. The tubular epithelium retains its pattern, but appears to fill the tubules.

The diagnosis is multiple papillomata of the ureter with malignant carcinoma at the base of the larger one.

SUMMARY

(1) Primary malignant tumors of the ureter are rare and occur chiefly after the age of fifty. Fifty cases have been previously reported, my case being the fifty-first.

(2) Sex seems to play an unimportant part.

(3) Stricture, diverticula and stones are thought by some to be predisposing causes.

(4) Sarcomas are exceedingly rare. Papillary carcinomas are the most common form and they may be multiple as in this case.

(5) The extremities of the ureters are most often involved.

(6) The cardinal signs and symptoms are the same as for tumors of the kidney, namely: (1) hematuria, (2) pain, (3) tumor, and (4) disturbance in the genito-urinary tract.

(7) Formerly the diagnosis was very difficult, most of the cases being diagnosed at operation or postmortem. However, at the present time, with our greatly improved x-ray and cystoscopic methods, including intravenous pyelography, the lesions should be recognized with less difficulty.

(8) These tumors metastasize extensively and early. Only one patient is on record who was alive 2½ years after diagnosis.

(9) Early nephrectomy and ureterectomy is the treatment of choice. However, deep x-ray therapy may be given postoperatively and in inoperable cases.

I hereby wish to thank Drs. J. S. Fleming and W. H. Gragg, of this city, for their most valuable aid in working up and treating this case.

1500 Bank of Commerce Building

ADENOCARCINOMA OF THE RECTUM*

By J. H. Dodson, M.D., F.A.C.S.,
Mobile, Ala.

Although it is generally conceded that there is no age limit to cancer of the rectum, the rarity of rectal malignancy in an infant of only twenty months of age justifies the following report:

A white female, age twenty months, had been in good health until one year of age, when the parents noticed beginning constipation. The constipation grew progressively worse until large amounts of laxatives were necessary. The stools became ribbon-shaped and there was a slight amount of mucus, but no blood. Recurrent attacks of retention of urine necessitated catheterization. A swelling was noticed in the left ischiorectal fossa. When first seen by the writer the child appeared fairly well nourished and seemed fairly comfortable. The x-ray showed nothing definite. The white blood count was 20,000. Distinct nodules could be felt in the liver. The whole left ischiorectal space was distended, so much so that the left lateral half of the anal circumference was completely everted. The anal orifice was shaped like a half moon. It was with difficulty that the little finger could be inserted into the rectum. There was a suggestion of fluctuation. The tumefaction felt like an encapsulated mass. There was no blood and the mucosa did not seem to be involved. The child was given a general anesthetic and an anteroposterior incision was made over the left ischiorectal fossa and the tissues separated down to the levator. This muscle was bulging outward. Some of its fibers were separated and the finger inserted into the superior pelvi-rectal space. This space was filled with necrotic tissue. There was no pus and no odor. Large pieces of necrotic tissue were expressed from the wound.

Fig. 1

The child died two weeks later. The accompanying microphotograph (*Fig. 1*) was made from a section of this tissue and was diagnosed by Dr. I. M. Wise, of Mobile, and Dr. John A. Lanford, of New Orleans, as adenocarcinoma, probably originating from embryonic cell rests.

*Received for publication May 5, 1933.

TUBERCULOUS ENDOPHLEBITIS WITH OBLITERATION OF THE SUPERIOR VENA CAVA: REPORT OF A CASE*

By HARRY C. SCHMEISSER, M.D.,
Memphis, Tenn.,
HENRY FULLER, M.D.,
Mulberry, Fla.,
and
I. H. JONES, M.D.,
Paris, Tenn.

This condition is not only very interesting, but extremely rare. Osler,[1] in 1903, writing "On Obliteration of the Superior Vena Cava," found only one case in the literature, "a remarkable case of tuberculosis† endophlebitis," reported by Banti[2] in 1891.

Brown,[3] in 1930, collected from the literature 300 odd cases of occlusion of the superior vena cava due to various causes. Although his cases date from 1806, he found no other case due to tuberculous endophlebitis.

Our search of the literature fails to reveal any further reported case.

We shall present in this paper an abstract of Professor Guido Banti's case, including an illustration of the lesion, a report of the clinical and pathological findings of our case with illustrations and photomicrographs, and a contrast of Banti's case with ours.

PROFESSOR BANTI'S CASE

A male, age 46 years, carpenter, native of Florence, died from acute miliary tuberculosis.

Autopsy revealed the superior vena cava converted into a hard cylinder with a vegetative mass occupying its auricular entrance, which microscopically proved to be a tuberculous endophlebitis (*Fig. 1*).

AUTHORS' CASE

Clinical Record.—The clinical record, as abstracted by Dr. Henry Fuller, Resident Physician, was as follows:

L. T., a married American negress, age 24 years, was admitted to the Memphis General Hospital on February 13, 1930, with a chief complaint of shortness of breath.

Present Illness.—For 4 years she had been subject to attacks of dyspnea and orthopnea with swelling of the face and arms. During the first two years these attacks were mild, but during the second two years she had four very severe ones. Each of these lasted for about 2 months. During an attack, she became very dyspneic and orthopneic, her face, neck and arms swelled, she developed a productive cough and raised an ounce or two of greenish yellow sputum daily; she felt feverish and was very ill. Then she improved, her cough completely disappeared, the edema and dyspnea almost disappeared but never entirely, allowing her to be up and to exert herself slightly. She had never had any hemoptysis.

Past and family histories were unimportant.

Physical Examination.—The patient was a well developed and well nourished negro woman, sitting propped up, almost erect, in bed, breathing with great difficulty. The muscles of the neck and thorax moved violently with each inspiration. There was marked edema of the eyelids, face, neck, hands, sacral region and to a less degree of the ankles and feet. The right and left external jugular and cephalic veins were distended. The superficial veins of the front of the neck and the right and left lateral thoracic, thoraco-epigastric and superficial epigastric veins were congested and tortuous. The voice was hoarse. The mucous membranes were slightly pale. No cyanosis was observed. The right pupil was slightly larger than the left and both reacted well to light and accommodation. Nothing abnormal was noted on examination of the ears, nose, mouth and throat. Expansion of the chest was thought

Fig. 1

This figure shows the right auricle and ventricle of Banti's case opened along the right margin. One can see a tuberculous, vegetative mass with a central fissure occupying the auricular orifice of the superior vena cava. The auricle below and to the left shows the remains of the orifice of the inferior cava.

*Read in Section on Pathology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

*From the Departments of Medicine and Pathology, University of Tennessee College of Medicine.

†Obviously a typographical error.

to be equal. The cardiac dullness was normal and the apex impulse was not palpable. The blood pressure was 120 systolic and 100 diastolic. The superior mediastinal dullness was increased and measured 9 cm. in the first and second interspaces. The right side of the chest showed signs of fluid: there was dullness to flatness below the sixth rib posteriorly and the fourth anteriorly. Over this area and in the axilla tactile fremitus was diminished and the breath sounds were diminished or absent. There was no bronchial breathing. On the left side, from the clavicle down to the fourth rib anteriorly and from the superior border of the scapula to its inferior angle posteriorly there was flatness and increased tactile fremitus. Medium crepitant rales were heard through both lung fields. There was thought to be a moderate amount of ascites because of shifting dullness in the flanks. Rectal and pelvic examinations were not done.

Laboratory Examination.—The urine contained a slight trace of albumin and a few hyaline and granular casts. The red blood cells numbered 5,500,000 with a hemoglobin content of 60 per cent (Sahli), and the white blood cell count was 5,400. The Kahn test of the blood was strongly positive. The sputum was scanty, purulent and on four examinations showed no tubercle bacilli. The non-protein nitrogen was 56 mg. and the creatine was 1.5 mg. per 100 c. c. of blood.

Roentgen Examination.—Roentgenograms of the chest taken on February 15, 1930, were reported by Dr. H. N. Pulliam as follows: "The upper left lung field shows a definite area of opacity extending from the apex to the level of the third rib anteriorly and having a circumscribed border, apparently a tumor formation. The right lung at the level of the third rib shows an oval area of opacity such as is usually caused by metastatic malignacy. The right base shows considerable fluid; the mediastinum shows marked widening."

Diagnosis.—The diagnosis was thought to be a mediastinal malignancy: (a) carcinoma from lung or pleura, (b) lymphosarcoma, or (c) Hodgkins' disease, with obstruction of the superior vena cava and partial obstruction of the bronchi.

Progress.—The patient ran a little fever, 101° F., the second day, and none thereafter, and she had a very rapid pulse, about 110. No change in her condition was noted except a disappearance of the edema of the feet and ankles and a drop in blood pressure to 120 systolic and 80 diastolic. She died 5 days after admission.

Autopsy.—The postmortem observations, reported by Dr. I. H. Jones, Resident Pathologist, were as follows:

The findings on external examination of the body confirmed those described clinically.

The peritoneal cavity contained 400 c. c. of clear, straw-colored fluid. The right and left superior and inferior epigastric veins were distended and tortuous. The portal vein and its tributaries were congested. On removing the sternum, the right and left internal mammary, anterior intercostals and subcostal veins were noticeably enlarged.

Beginning at the apex of the left pleural cavity and extending to the third rib anteriorly and thence transversely around the circumference, the parietal pleura was diffusely thickened and hyalinized. This part of the pleural cavity was walled off by dense adhesions forming a cavity approximately 7 cm. in its greatest diameter filled with serous fluid. Consequently, the upper lobe of the lung was displaced downward below the level of the bifurcation of the trachea and compressed.

The right pleural cavity in the upper part of its lower half was almost completely obliterated by massive, fibrous tissue adhesions, which gave place in the lower part to a dense, bluish-white, translucent tissue with small yellow, opaque areas. The parietal pleura of the lower half of the pleural cavity was uniformly greatly thickened and hyalinized. Numerous dense adhesions were present in the region of the cervical pleura. The remaining space of the pleural cavity was filled with a serosanguinous fluid.

The findings in the mediastinum will be described under heart, etc.

The pericardial cavity was negative.

The heart with its great vessels, the trachea and primary bronchi and the right recurrent laryngeal nerve were studied in relation to each other. The heart alone weighed 280 gm.

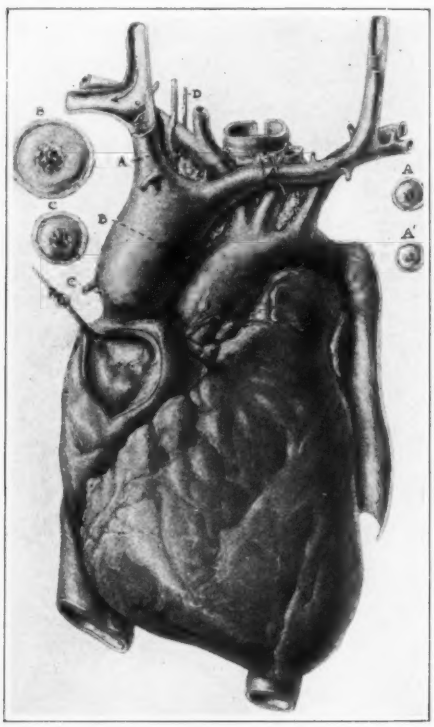

Fig. 2

The heart and its great vessels. The lower part of the left internal jugular, both innominates except for a small superior part of the right and entire superior vena cava are enlarged and their lumina obliterated. See cross sections (A, A^1, B, C). The endocardium covers the auricular orifice of the superior vena cava. The obstruction involves the entrance of the right and left inferior thyroid and internal mammary, and left vertebral, subclavian and highest intercostal, and azygos veins. The inferior vena cava is dilated. Pressure was exerted on the right recurrent laryngeal nerve (D). The left common carotid takes origin from the innominate artery.

The lower part of the left internal jugular, both innominates except for a small superior part of the right, and the entire superior vena cava were enlarged and firm. The greatest cross diameter of each innominate was 0.7 cm. and of the superior vena cava 3 cm. (*Fig. 2*). Cross sections of each of these vessels showed their lumen completely closed with a tissue which contrasted sharply with the surrounding vessel wall by being bluish-white, translucent and firm in its periphery and more yellow, opaque and soft in the center. The pathological process seemed to be confined to the intima and lumen of the vessels (*Fig. 2, A, A¹, B, C*). The obstructing tissue in the superior vena cava at its auricular entrance receded slightly from the surrounding inner surface of the auricle and was completely covered by a smooth and glistening endocardium.

The obstruction in these vessels involved the entrance of the right and left inferior thyroid and internal mammary, left vertebral and subclavian. These vessels, as well as both internal jugulars, the right subclavian and both axillary, brachial and basilic veins were all distended with blood while the heart was *in situ*.

The azygos was obstructed at its entrance into the superior vena cava and the left highest intercostal at its entrance into the left innominate. The right and left posterior intercosta's and subcostals, right and left highest intercostals, azygos, hemiazygos and accessory hemiazygos, right and left ascending lumbars, lumbars and ileolumbars, great saphenous, femoral, external and common iliacs and the inferior vena cava were all distended with blood while the heart was *in situ*.

The enlarged right innominate vein pressed on the recurrent laryngeal nerve and the superior vena cava slightly compressed the right bronchus. The left common carotid artery took origin from the innominate artery 0.5 cm. above the origin of the latter from the arch of the aorta. The heart and aorta otherwise were normal.

All lobes of the right lung were adherent to each other by fibrous tissue. The pulmonary pleura was everywhere moderately thickened. Scattered through the lung were a few small, circumscribed, bluish-white, translucent nodu'es with a tiny yellow, opaque center. One such nodule was calcified in its periphery. Otherwise the lung presented nothing of interest. Its bronchial lymph nodes were uninvolved.

The pulmonary pleura of the upper lobe of the left lung was somewhat thickened and this lobe was compressed, airless, firm, red, with a moderate amount of black coal pigment. The rest of the lung and its bronchial lymph nodes presented nothing of interest.

The spleen was smaller than normal, weighing 85 gm. Its capsule was thickened and milky. Its consistency was increased. On section the trabeculae were prominent and the pulp was a dark red. A rather circumscribed small bluish-white, translucent area with a yellow opaque center was present.

The esophagus, stomach, intestines, pancreas, liver, suprarenals and kidneys showed chronic passive congestion.

The pelvic and genital organs showed nothing of interest except for a bilateral hydrosalpinx. The organs of the neck and head were not removed.

Microscopic Examination.—The parietal pleura from the walled off space of the left pleural cavity was infiltrated with lymphocytes and plasma cells and covered by an organizing serofibrinous exudate.

The obliteration of the lower part of the right pleural cavity was due to a chronic tuberculous granulation tissue, consisting of new formed blood capillaries and fibrous tissue infiltrated with lymphocytes and plasma cells. In places were seen Langhan's type of giant cell, surrounded by epithelioid and lymphoid cells with a bit of caseation to form a tubercle.

The obliterated part of the left internal jugular, the innominates and the superior vena cava showed an uninvolved adventitia, but a media with some small round cell infiltration. The intima was the seat of an extensive tuberculous inflammation consisting of epithelioid, lymphoid and Langhan's giant cells, and caseation with its characteristic nuclear dusting. This process completely obliterated the lumen of the vessel (*Figs. 3* and *4*).

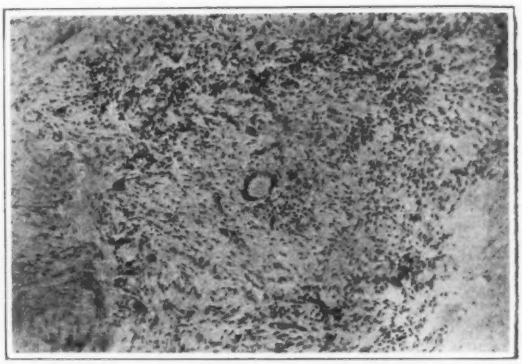

Fig. 3

Tuberculous endophlebitis of superior vena cava. Media on the right. In the center is the intima with Langhan's giant cell, epithelioid and lymphoid cells in the formation of a miliary tubercle. Photomicrograph X 200.

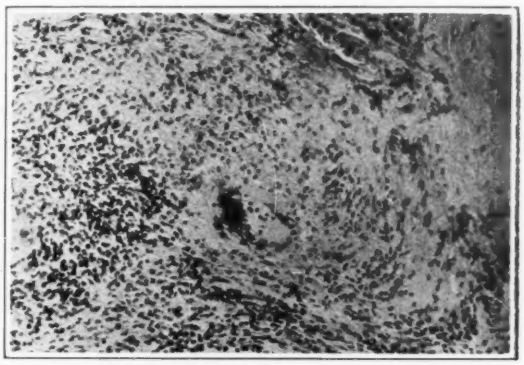

Fig. 4

Tuberculous endophlebitis of the superior vena cava. Higher magnification. On the right, media. In the center is a miliary tubercle in the greatly thickened intima, showing epithelioid and lymphoid cells and Langhan's giant cell. Photomicrograph X 300.

The right lung presented a number of miliary and conglomerate tubercles and a bronchus whose wall was the seat of tuberculous inflammation consisting of epithelioid, lymphoid and Langhan's giant cells and caseation. The process had reached the lumen of the bronchus around one-half of its circumference.

The upper lobe of the left lung showed a fibrous, thickened pleura, infiltrated with lymphocytes and plasma cells and a subserous deposit of coal pigment in moderate amount. The lung tissue was atelectatic.

The spleen showed a thickened, hyaline capsule, trabeculae and interstitial tissue. An encapsulated tuberculous area was present. Sinuses in places contained an excess of blood.

The liver and kidneys showed chronic passive congestion.

Bacteriologic Examination.—Sections of the obliterated superior vena cava, stained with carbol fuchsin and counter-stained with Loffler's methylene blue, showed numerous tubercle bacilli in the active periphery of the intimal lesion.

Anatomic Diagnosis.—In the primary series there was bilateral chronic tuberculous sero-fibrinous pleurisy with marked fibrosis; atelectasis of the upper lobe of the left lung; chronic localized tuberculosis of the terminal bronchi, lungs and spleen; chronic interstitial and perisplenitis; chronic tuberculous endophlebitis with obliteration of the lower part of the left internal jugular and both innominate veins except for a small superior part of the right and entire superior vena cava; chronic passive congestion of the entire systemic venous circulation except that of heart; ascites; and generalized anasarca.

In the subsidiary series, the left common carotid artery took origin from the innominate artery. There was bilateral hydrosalpinx and anthracosis.

The cause of death was venous stasis of the systemic circulation except that of the heart.

BANTI'S CASE AND OUR CASE CONTRASTED

Clinical Record.—Banti's case was a male carpenter, age 46 years, a native of Florence, who died from acute miliary tuberculosis. No exact information about the patient's final illness, past history, family history, physical examination or diagnosis was obtained. Apparently, he did not have in the past any other important diseases. It is certain that during his stay in the hospital he did not have any signs of venous stasis or edema of the head, neck and upper extremities.

Our case was a woman, age 24 years, an American negress, who died from venous stasis of the systemic circulation excluding that of the heart. A complete clinical record was obtained. The findings were those of the above mentioned stasis, more marked in the upper half of the body, with a diagnosis of a mediastinal malignancy with obstruction of the superior vena cava.

Autopsy.—Banti's case showed on external examination no congestion of veins.

On internal examination there were no signs of venous stasis or edema in the superior parts of the body. The collateral circulation was not studied. In the right lung was a caseous area as big as a nut, completely surrounded by fibrous tissue. No extra-visceral disease was found in the mediastinum.

In the heart, the superior vena cava except for a small upper portion was completely obliterated by a tuberculous endophlebitis, which projected as a lobulated mass from the orifice into the auricle. This mass contained a blind fissure and was thought during life to have been covered by endothelium. The obliteration was accomplished without thrombosis. The outer surface of the cava was normal. Tubercle bacilli were demonstrated in section throughout the obliterated tissue.

In our case, on external examination, there were congested and tortuous veins indicative of the obstruction of the superior vena cava and the established collateral circulation.

On internal examination there were congested veins and dropsy indicative of the obstruction of the superior vena cava and the established collateral circulation. No extra-visceral disease was found in the mediastinum.

In the heart, the lower part of the left internal jugular, both innominates except for a small superior part of the right and the entire superior vena cava were completely obliterated by a tuberculous endophlebitis without thrombosis. Tubercle bacilli were demonstrated in section in the intimal lesion. The auricular orifice of the cava was completely covered by endocardium. The enlarged right innominate vein pressed on the recurrent laryngeal nerve and the cava slightly compressed the right bronchus. The left common carotid artery took origin from the innominate artery 0.5 cm. above the origin of the latter from the arch of the aorta.

Discussion.—In Banti's case the tuberculous product presented characteristics in some ways the same as the solitary tubercle of the brain. It formed a mass having the appearance of a real tumor and made up of an unlimited number of elementary tubercles, caseous in the older portion and cellular in the younger, with a stroma of fibrous connective tissue.

The process began in the superior part of the cava near the outflow of the two innominates with an annular enlargement of the intima involving the entire circumference of the vein formed of a conglomeration of miliary tubercles. By the addition of more and more tubercles the

lumen became smaller and smaller. Finally the endothelium was destroyed and the tuberculous tissue fused, obliterating the lumen completely from the upper part of the cava to the auricle. At the time of death only a small portion of lumen still remained as a blind fissure in the auricular end.

It was undecided which was the primary focus, the old lesion in the right lung or the lesion in the superior vena cava. It was also possible that both were secondary to a contemporaneous blood infection, in which case part of the infected material stopped in the cava and a part lodged in the lung. It is also possible that the focus in the lung was bronchogenic.

The acute miliary tuberculosis was thought to have had its dissemination from the projecting mass of the vein.

Of special significance is the fact that the superior vena cava closed completely without existing signs of venous stasis or of edema in the superior parts of the body, and perhaps also without their ever being manifested at any time during the patient's life. This singular occurrence has not been observed in other cases of obliteration of the superior vena cava. It could not have happened but for two conditions: (1) that the closure of vein was produced very slowly; (2) that the compensatory collateral circulation was easy and perfect.

Banti did not find in the medical literature another case of tuberculosis of blood vessels which resembled his case.

In our case, the vessels affected by the obliteration of the lower part of the left internal jugular, both innominates except for a small superior part of the right and entire superior vena cava; and the collateral circulation established in returning blood from head, neck, arms and thorax to the right auricle by way of the inferior vena cava is well shown by means of a diagrammatic illustration A*Fig. 5*). As the left internal jugular, vertebral and inferior thyroid a diagrammatic illustration (*Fig. 5*). As the left side of the head had to drain either by means of the left external jugular alone or to pass by capillary anastomosis to the right external jugular, internal jugular and vertebral veins into the subclavian, axillary, join with the blood from the cephalic, brachial and basilic of the right arm and pass by way of the right lateral thoracic, thoraco-epigastric, superficial epigastric into the right great saphenous, femoral, external iliac, common iliac and inferior vena cava to the right auricle. The right inferior thyroid also met with obstruction.

The blood from the left external jugular, after reaching the left subclavian, passed into the axillary, where it was joined with the blood from the cephalic, brachial and basilic of the left arm, passed by the left lateral thoracic, thoraco-epigastric and superficial epigastric into the left great saphenous, femoral, external iliac, common iliac and inferior vena cava to the right auricle.

As the right internal mammary was obstructed at its entrance into the right innominate, the blood from the right anterior thorax was therefore carried by means of the right anterior intercostals and subcostal, dilated superior epigastric and inferior epigastric into the external iliac, common iliac and inferior vena cava to the right auricle. As the left internal mammary was obstructed at its entrance into the left innominate, the blood from the left anterior thorax was therefore carried by means of left anterior intercostals and subcostal, dilated superior epigastric and inferior epigastric into the external iliac, common iliac and inferior vena cava to the right auricle.

The azygos was obstructed at its entrance into the superior vena cava and the left highest intercostal at its entrance into the left innominate. Therefore the blood from the right and

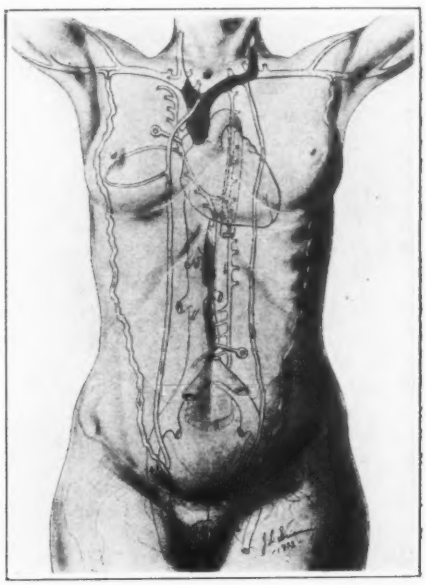

Fig. 5

Blood from head, neck, arms and thorax returns to the heart by means of a collateral circulation and the inferior vena cava. The obliterated vessels are darkly shaded.

left posterior intercostals and subcostals draining into the right and left highest intercostals, azygos, hemiazygos and accessory hemiazygos passed by means of dilated right and left ascending lumbars, lumbars and ileolumbars into the common iliacs and inferior vena cava to the right auricle.

Briefly stated, all the blood from head, neck, arms and thorax returned to the heart by means of a collateral circulation and the inferior vena cava.

The entire systemic venous system, except that of the heart, was in a state of chronic passive congestion, and many normally insignificant veins had become prominent. This explained such symptoms as dyspnea, orthopnea, cyanosis and dropsy. Hoarseness and cough were due to pressure of the enlarged right innominate vein on the right recurrent laryngeal nerve.

To be emphasized is the complete closure of the lumen of the obliterated vessels and the intact endocardial covering of the auricular orifice of the superior vena cava.

The anomaly of the left common carotid artery taking origin from the innominate artery might suggest that the closure of the auricular orifice of the superior vena cava was congenital. Could the patient have had her abnormal circulation for 24 years? After a congenital closure, tubercle bacilli from the focus in the lung or pleural cavity could have entered the circulation and could have settled out from the blood into the superior vena cava causing the endophlebitis. This might explain the occurrence of a tuberculous endophlebitis of the superior vena cava which must be considered very rare.

CONCLUSION

(1) The second case of tuberculous endophlebitis with obliteration of the superior vena cava is reported.

(2) The occlusion was complete.

(3) The blood from the entire systemic venous circulation except that from the heart entered the right auricle by means of the inferior vena cava.

(4) The entire systemic venous circulation except that of the heart was in a state of chronic passive congestion.

(5) The collateral circulation is recorded diagrammatically.

(6) The anomaly of the left common carotid artery taking origin from the innominate artery might suggest that the closure of the auricular orifice of the superior vena cava was congenital.*

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DISCUSSION (*Abstract*)

Dr. Neuton S. Stern, Memphis, Tenn.—An unusual case always brings up in my mind the question, could an approximately correct diagnosis have been made from the clinical data? Often it can be, if we take the time to consider the facts carefully.

Here there is unquestionably a lesion in the mediastinum large enough to cause pressure symptoms; these symptoms are the swelling of the vessels of the head, neck and arms with cyanosis of these parts. The fluid in the right chest indicates that the azygos vein is involved in the process. The x-ray findings show that the process is extensive, not only involving the mediastinum but the lung parenchyma as well. The x-ray is furthermore highly suggestive of tumor growth.

The presence of enlarged veins over the chest and abdominal wall indicates that the process is severely obstructive, but slowly developing so that time is given for the development of this collateral circulation.

Ascites and edema of the extremities show that the total circulation has been definitely slowed up by the process. There is a possibility that the inferior cava is involved as well as the superior. So much is clear, then, that there is a lesion of considerable severity, duration and extent in the mediastinum. Is there any evidence that helps to determine the type of lesion present?

The x-rays show circumscribed borders which certainly suggest neoplastic tissue of some type. The cycles of fever in the previous two years are not against this; especially Hodgkin's is possible. But the severity of the obstructive phenomena, dyspnea and cyanosis, with great improvement following, four cycles of this certainly does not resemble the remorseless though sometimes hesitating progress of neoplastic disease.

The spells of fever may just as well signify exacerbations of infection. There are two chronic infections that produce distinct tissue infiltration. Syphilis is one of these and a four plus Kahn makes it likely, but it is not so common as the other disease, and the presence of syphilis may be merely a concomitant finding. The second infection is tuberculosis. The patient is relatively young, the seat of the lesion is a common one, the mediastinal lymph nodes, and these nodes sometimes become quite large, extending into the lung with a fairly well defined border. The increase of symptoms, with fever and malaise, and the production of sputum are all compatible. There is no evidence against this. Whether the process compresses the veins from

*We are indebted for the illustrations and photomicrographs of this case to Mr. Joseph L. Scianni, Artist, University of Tennessee, Pathological Institute.

without or blocks them from within is clinically of no significance unless metastatic lesions should be found.

Reviewing the evidence from the hind side, it is evident now that a fairly accurate diagnosis of this unusual situation could possibly have been made in advance.

ROGER ANDERSON APPARATUS IN FRACTURES OF THE LOWER EXTREMITY*

By JAMES R. BOST, M.D.,
Houston, Tex.

An apparatus using the sound leg for counter traction has been in general use among orthopedists for several years. This apparatus consists of two bars of steel incorporated in a double plaster-of-Paris spica with a windlass placed between the bars near the end of the apparatus a few inches distal to the foot on the injured side. The spica extends from above the rib margin to the knee on the affected side and includes the foot on the sound side. Adhesive plaster is applied to the injured leg for traction. As pull is exerted on the affected side, counter pressure is made on the sole of the opposite foot. This apparatus was devised by Dr. Michael Hoke[1] about 1916 and he referred to the method as "plaster traction." It was never reported by him, although he exhibited it to surgeons visiting his clinic and in April, 1926, when the American Orthopedic Association met in Atlanta, he presented models and cases illustrating the principle. I first used the apparatus in 1921, since which time I have used it more or less routinely where traction was needed in congenital dislocations of the hip and in the treatment of certain fractures of the femur in children.

Since Dr. Hoke brought this principle to our attention numerous modifications have been used, each modifier adding his own ideas. Most of these changes have tended to lessen the amount of plaster applied and to allow more freedom of motion to the patient.

In October, 1931, Dr. Roger Anderson[2] reported a method of well leg counter traction in which he used skeletal traction and limited the plaster immobilization to the legs and feet, thus allowing the patient to assume the sitting posture. Dr. Anderson's apparatus also allows easy adjustment of rotation on the affected side. Discussion of the construction, use, and application of this apparatus is unnecessary since these details have been reported by Dr. Anderson.[3]

In treating fractures of the hip in elderly persons I have felt that the danger of complications would be lessened if it were possible to allow the patient a greater range of activity during treatment. It is conceded that complete immobilization of the patient is not conducive to his general well-being and often is a direct factor in causing distressing complications. For this reason I was impressed by Dr. Anderson's apparatus, since his method would allow flexion and extension of the hip while treatment was in progress. This added freedom is the greatest advantage which his apparatus has over the usual methods.

In addition to this major advantage, it is possible, should the necessity arise, to apply the Roger Anderson apparatus outside of the hospital and in the majority of cases with only local anesthesia. Nursing care is simplified and personal visits by the attending surgeon can be greatly reduced. Another item of considerable importance to the average patient is that the hospitalization can be shortened. In this small series of cases the average number of hospital days is five and four-fifths after the apparatus was applied. (Four patients reported in this paper who remained in the hospital for reasons other than the fracture are not included in this average.)

It is well to consider the mechanisms by which reduction is obtained in fractures of the neck of the femur. When the Anderson apparatus is used, traction through the long axis of the limb is applied by turning the wing nut on the sound side. Counter traction comes through the upward thrust on the well leg. Abduction is secured by tilting the pelvis. Internal rotation is accomplished and maintained by adjusting the toothed clutch at the end of the apparatus on the injured side. It is obvious that hyperextension at the hip joint cannot be maintained by this apparatus. In the one case of fractured neck of the femur reported here, in which union has occurred, the fragments were impacted so solidly that union would probably have been secured with little or no treatment. Sufficient time has not elapsed to report end-results on the other fractures of the neck of the femur. For these reasons I am unable to say whether or not fixed hyperextension is necessary for union of the fracture, but I can say that it is not necessary for an accurate reduction of the fracture itself (*Figs. 1, 2, 3* and *4*). In old fractures

*Read in Section on Bone and Joint Surgery, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

of the long bones of the lower extremities, where there is overriding or bowing with shortening of the musculature, it has been found that both the soft tissue contracture and the skeletal deformity can be gradually overcome by means of the Roger Anderson apparatus without the shock which attends immediate operative reduction (*Cases 7* and *8*).

I have not determined the actual amount of pull that can be exerted by the apparatus without causing injury to the sound leg. However, I am convinced that a sufficient pull can be exerted to justify its use in any fracture of the lower extremity in which extension is desired and in which this apparatus is indicated.

From time to time objections have been raised against the use of the Steinman pin, the principal objection being the possibility of injection. In a number of cases, in addition to those in this report, I have used these pins and allowed them to remain through the bone for varying periods of time, the shortest in this series being seven weeks and the longest four months. I have yet to see infection following their use. The reason for this may be that I have found it unnecessary to make a preliminary incision for the insertion of pins.

The short time which I have used this apparatus obviously places this paper in the category of a preliminary report and it should not be assumed that end-results are being reported, none of my patients having reached the point where a correct evaluation of end-results can be made. I feel certain that a very definite place will be found for this apparatus in treating fractures of the lower extremity, including unilateral fractures of the pelvis.

Case 1.—McN., a man, age 48 years, weight 190 pounds, had an impacted central fracture of the neck of the right femur. The patient fell off a porch May 22, 1932. On May 23, a long plaster spica was applied to the right leg after the method of Whitman. Spinal anesthesia was used. On the morning of May 24, he developed an acute myocardial insufficiency. He lost consciousness and his pulse was imperceptible. The plaster spica was removed. He responded to treatment and improved to such an extent that on May 31, with the use of novocaine for the introduction of the Steinman pin, the Roger Anderson apparatus was applied. The patient was discharged from the hospital eight days after the application of the apparatus. On June 25, the patient was up in a wheel chair. The appliance was removed in a little less than three months, when roentgenograms demonstrated union. On October 8, roentgen examination revealed solid union with no evidence of absorption of the neck.

Case 2 (*Figs. 1 and 2*).—S. B. J., a woman, age 67 years, weight 130 pounds, had a transverse fracture of the neck of the left femur. The patient fell and injured her left hip on July 31, 1932. I first saw her on August 1. Examination revealed pain on motion of the left hip with an external rotation and flexion deformity. Roentgenograms demonstrated a transverse fracture of the neck of the left femur with a displacement of fragments. On the same day a Roger Anderson apparatus was applied and traction begun. Roentgenograms the following day showed good reduction of the fracture. The patient was ready for discharge from

Fig. 1, Case 2 (left). Fractured neck of the femur before reduction.
Fig. 2, Case 2 (right). Five days after reduction.

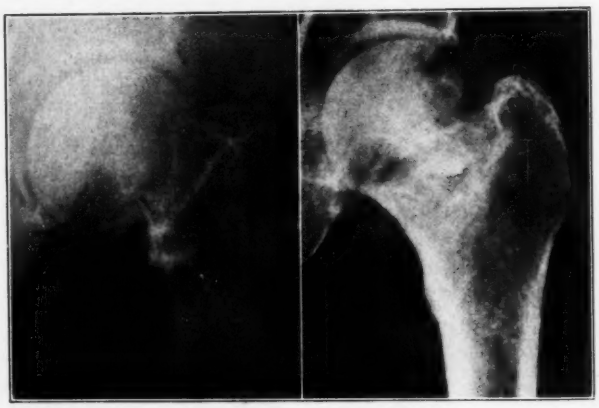

Fig. 3, Case 3 (left). Fractured neck of the femur before reduction.
Fig. 4, Case 3 (right). Seven weeks following reduction, showing some absorption of the neck.

the hospital on August 8, but on account of the fact that she lived a considerable distance from Houston and was suffering from senile dementia, she remained in the hospital at the request of her relatives until September 11.

Case 3 (*Figs. 3 and 4*).—E. B., a woman of 79 years, weight 104 pounds, had a central fracture of the neck of the right femur. On September 18, 1932, she fell down the steps and injured her right hip. Two days later a Roger Anderson apparatus was applied in the hospital, using local anesthesia for introduction of the Steinman pin. She was discharged from the hospital four days later and in another four days was up in a wheel chair. Roentgenograms taken on November 5 showed good position of the fragments, but some absorption of the neck of the femur (*Fig. 4*).

Case 4 (*Figs. 5 and 6*).—R. K. G., a man, age 42 years, weight 110 pounds, had an intertrochanteric fracture of the right femur. On August 3, 1932, he fell from a ladder and injured his right hip. When seen on this date the patient was nervous, very much underweight and anemic. The Steinman pin was introduced under local anesthesia and the Roger Anderson apparatus applied. Ten days later he left the hospital. The apparatus was removed on September 26, making a total of 51 days from the date of application. The fragments were shown by roentgenograms to be in good position and firmly united.

Case 5 (*Figs. 7 and 8*).—The case of P. L., a man, age 49 years, weight 220 pounds, was diagnosed as: (1) fracture of the right ilium through the acetabulum with a partial central dislocation of the head; and (2) fracture of the descending ramus of the right pubic bone. The patient was injured in an automobile accident June 16, 1932. He came under my care eight days later. On June 25, a Roger Anderson apparatus was applied, using local anesthesia for introduction of the Steinman pin. Traction was begun and roentgenograms of the pelvis revealed satisfactory reduction of the fragments. This patient remained in the hospital four days after the apparatus was applied. He was up in a wheel chair 12 days after reduction. On August 6, roentgenograms showed firm union of the fragments and the apparatus was removed (*Fig. 8*).

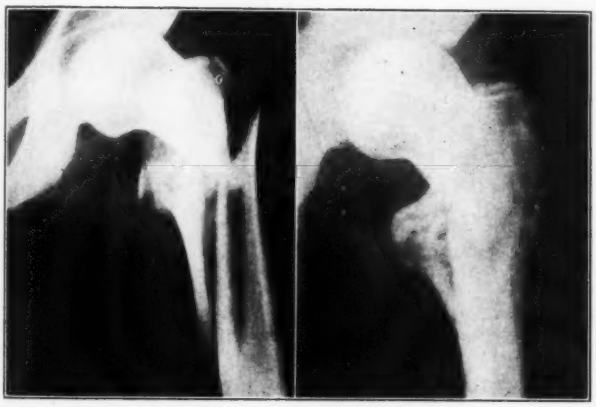

Fig. 5, Case 4 (left). Intertrochanteric fracture of the femur.
Fig. 6, Case 4 (right). Seven weeks after reduction.

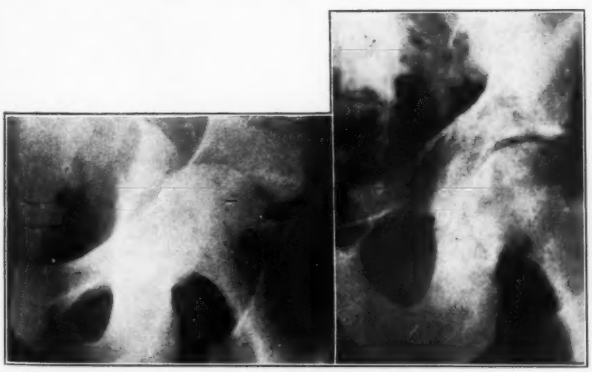

Fig. 7, Case 5 (left). Fracture of the ilium and descending ramus of the pubis.
Fig. 8, Case 5 (right). Six weeks after reduction.

Case 6.—A. Q., a woman, age 84 years, weight 106 pounds, had a fracture of the middle of the shaft of the left femur and a fracture of the right clavicle and Colles' fracture of the right forearm. The patient fell down stairs January 15, 1932. Because of the danger of strict confinement in the recumbent position which would be necessary if any of the usual methods of traction were used, it was decided to do an open reduction. On January 17, the femur was plated. On April 5, roentgenograms revealed some antero-lateral bowing with evidence of delayed union. On this date the bowing was corrected and a new spica was applied. On July 19, roentgen examination demonstrated that bowing had recurred with consequent dislodgement of one end of the plate. It was felt that a Roger Anderson apparatus was indicated. The plate was removed under ethylene anesthesia and the Anderson apparatus applied. I was able to correct and maintain alignment of the fragments with the apparatus and the patient has had much more comfort and freedom than she experienced while in the plaster spica. Roentgenograms made on October 31 show new bone formation.

Case 7.—F. V. C., a boy of 13 years, weight 70 pounds, had an old fracture with non-union and malposition of the middle of the shaft of the right femur. In November, 1931, he fractured the right femur while playing football. He was treated by Dr. M. with Buck's extension for six weeks, followed by a plating of the femur. When the patient was allowed to walk the femur began to bow at the site of the fracture. This bowing noticeably increased until eight months later (August 31), when the patient came under my care. On this date the well leg traction apparatus was applied, using

local anesthesia for inserting the Steinman pin. On September 13, the angulation of the femur and muscle shortening was overcome sufficiently to warrant operation. On September 15, a sliding bone graft operation was done with the Anderson apparatus still in place. Alignment was maintained by slight traction.

Case 8.—A. B., a man, age 35 years, weight 145 pounds, had a transverse fracture of the shaft of the left femur at the junction of the upper and middle thirds. The patient was injured in an automobile accident on August 4, 1932, and was treated in a rural hospital. The case was referred to me on September 8. Roentgenograms showed a fracture at the junction of the upper and middle thirds of the left femur with massive callus formation. There was a three-inch overriding of the fragments. By manipulation under spinal anesthesia we were able to fracture the new bone formation. On September 19, a Roger Anderson apparatus was applied. The Steinman pin was introduced under local anesthesia. With a moderate amount of traction the position was corrected until there remained only one-half inch of shortening. On September 21, the fracture was plated by open operation.

Case 9.—G. Y., a woman, age 45 years, weight 181 pounds, had a comminuted fracture of the upper end of the right tibia. On September 17, 1932, the patient fell down a short flight of steps and injured her right knee. One attempt at closed reduction was made without success. On September 23, an attempt was made to secure the fragments in place with a long wood screw. Subsequent roentgenograms revealed this to be unsuccessful. On September 30, the long screw was removed and replaced by a short one. This was also unsuccessful. When she was first seen by me on October 11 there was swelling about the right knee with lateral displacement of the tibia on the femur. Roentgenograms showed a comminuted fracture of the upper end of the right tibia involving the knee joint. There was one and one-quarter inches shortening. The Roger Anderson apparatus was applied and the small screw which had previously been introduced was removed. Traction was applied to the limb and roentgenograms on October 12 revealed a correction of the shortening and good alignment of the fragments.

Case 10 (Figs. 9 and 10).—K. H., a woman, age 48 years, weight 158 pounds, had a comminuted fracture of the upper end of the right tibia. The patient fell a distance of about eight feet on September 27, 1932, and injured the right knee. She was referred to me on October 1. There was marked swelling of the knee, genu valgum, and one inch of shortening in the right lower extremity. Roentgenograms revealed a comminuted fracture of the upper end of the tibia extending into the knee. On October 3, the Roger Anderson apparatus was applied. Local anesthesia was used to insert the Steinman pin. Traction was begun and roentgenograms taken 3 days later showed that the shortening had been overcome and fragments were in good position. Six weeks later roentgenograms revealed good union.

Fig. 9, Case 10 (left). Comminuted fracture upper end of tibia.
Fig. 10, Case 10 (right). Six weeks after reduction.

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DISCUSSION (*Abstract*)

Dr. W. B. Carrell, Dallas, Tex.—The principle of traction as applied by Dr. Anderson seems sound and in a few cases has, in our experience, been comfortable and efficient. In one case of comminuted fracture of the femur, with pin fixation in the lower fragments, the result was excellent. This was a compound fracture at the lower third, of five months' duration, with overriding. The apparatus was applied, fragments were released by open operation, and in two weeks two inches of overriding had been corrected. Union occurred following this procedure and the infection gradually became less and is now almost well. Another compound fracture in the middle third of the femur did not remain in good position, even with counter pressure, which we attributed to a lack of fixation by the apparatus. It appeared to us that the Roger Anderson splint was good in fractured femurs only when a pin was inserted in the lower fragment for the traction or to supplement the pin in the leg for the purpose of holding the lower fragment in good alignment.

We have used the method in two cases of fracture in the neck of the femur. Both were reduced to excellent positions. One united, the other did not. The case going to non-union remained in excellent position throughout, but never was well impacted and absorption appeared at the proximal fragments. In both of these cases we had attempted on getting sufficient traction to impact the head through pounding on the trochanter. We have not been well impressed with the adaptability of this splint for neck fractures because it appears to distract the fracture rather than to impact it as seems desirable in fractures of the neck of the femur. In two cases used for the purpose of traction in children preliminary to a hip operation the method

has been admirable. The hip was pulled down until the head was opposite the acetabulum during a period of ten days or two weeks, permitting operation without the tension usual in such cases. We have not used the method in compound leg fractures, but it seems desirable that a fixed traction which would permit a change of dressings without disturbing the relation of bone would be well applied by this method. The ideal indication in our opinion has been in fractures through the trochanter. These were discussed in Dr. Speed's paper.

Dr. J. Albert Key, St. Louis, Mo.—As has been stated, the Anderson apparatus embodies a principle used by Dr. Hoke for some years and I have been impressed by the fact that with Dr. Hoke's method a given amount of traction appears to be more efficient than with other methods. I believe that the Anderson apparatus is good for the treatment of trochanteric fractures at the hip, but I do not believe that it is good for fractures through the neck of the femur, nor do I believe that it is as efficient as many other methods for fractures of the shaft of the femur or for other fractures in the lower extremity. The fact that one surgeon can get good results with a method which he uses extensively does not mean that it is necessarily the ideal method in the hands of the average surgeon.

Dr. Joseph I. Mitchell, Memphis, Tenn.—The treatment of fractures with the Roger Anderson splint depends upon skeletal traction to the injured leg while employing the uninjured leg for counter traction. This method is claimed by Dr. Anderson to be an original and effective means of securing constant traction. We all know that in the treatment of fractures the important thing is what kind of doctor is using the splint, and not what kind of a splint the doctor is using.

My own experience with the well leg counter traction splint is limited to one case. Dr. Anderson visited in Memphis last spring just after the American Medical Association meeting. I had the pleasure on that occasion of watching and assisting him to apply the splint to a patient who had a fracture of the pelvis involving the acetabulum with a central dislocation of the head of the femur. This would probably have been an ideal case for traction immediately after the injury, but, unfortunately at the time we first saw the patient, the fracture was of six weeks' duration. Reduction was not accomplished, and an open operation was performed later. In fairness, however, it should be stated that the failure was undoubtedly due to the dense fibrous adhesions and bony callus which were present and not to mechanical inefficiency of the splint.

My personal belief is that comparatively few fractures require skeletal traction and that the majority of cases may be treated by other methods. When skeletal traction is needed, the Roger Anderson splint is a convenient and efficient appliance. It would seem to be particularly applicable to certain fractures of the pelvis and to intertrochanteric and subtrochanteric fractures of the femur. I am by no means convinced that the method provides sufficient immobilization for treating central fractures of the neck of the femur, nor do I believe that it is the method of choice for treating fractures of the shafts of the femur and the tibia.

Dr. Bost (closing).—Those discussing this paper seem of the opinion that the apparatus is ideal in the treatment of intertrochanteric fractures, but that it is probably not the best method of treating fractures of the neck or shaft of the femur or of the shaft of the tibia. To some extent this coincides with the opinion I have formed. I agree with Dr. Mitchell that his patient with a fracture of the pelvis was not a fair test of the apparatus, since consolidation and scar tissue formation had taken place before the beginning of treatment. In unilateral fractures of the pelvis my results have been much better than those achieved by any other method which I have used. I have become convinced that the Roger Anderson apparatus is the method of choice in these fractures.

In fractures of the femur with malunion and marked overriding, the apparatus may be used to overcome the shortening of the soft tissues without the shock which often follows immediate reduction. In treating fractures of the lower extremity with this apparatus, there is a reduction of hospital days, which is a very definite advantage over other methods of treatment. Although this apparatus is not a cure-all for fractures of the lower extremity, it is definitely indicated in unilateral fractures of the pelvis, intertrochanteric fractures, comminuted fractures of the upper end of the tibia, and fractures of the femur with malunion and overriding. The fractures coming under the last classification would not have had the same results with the same ease and lack of shock by any other treatment.

I feel that the apparatus was definitely indicated in all the cases reported in this paper except the fractures of the neck of the femur. My reason for excepting these fractures is that enough time has not elapsed to determine end-results. As to its applicability to the remainder of the fractures of the lower extremity, further experience will be necessary before I will be willing to pass judgment. I am giving the apparatus a fair trial and at some future date I intend reporting end-results and giving my opinion as to the indications for its use.

THE ROLE OF THE AUTONOMIC NERVOUS SYSTEM IN AFFECTIVE BEHAVIOR*

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Affective, or emotional, states may be regarded as complex responses to stimulating situations carried out according to typical reaction patterns which are determined by the inherited nervous organization of the individual. The somatic manifestations of affectivity are subject to modification by training and voluntary inhibition; the visceral manifestations are not subject to direct voluntary control, but are not wholly independent of the somatic manifestations and may be modified in some measure by reason of the control or inhibition of the latter. The visceral reactions to affective stimulation are mediated through the autonomic nerves and are con-

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

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cerned mainly with changes in the functional states of the visceral organs, including the cardiovascular system, which, in a large measure, determines the availability and distribution of energy in the body.

Nature of Visceral Affective Reactions.—Affective behavior varies within wide limits both in its outward and inward manifestations. In some instances, the outward manifestations are almost imperceptible; the inward manifestations also involve but slight changes in the visceral functions. In other instances, the outward manifestations are characterized by commotion and the mobilization of energy or the inability to mobilize energy; the inward manifestations involve marked changes in the visceral functions. In general, the stronger emotional states are characterized by attempts to retreat from specific stimulating conditions or to become adjusted to them. For example, fright is characterized by a mass reaction of the body designed to remove it from the source of stimulation. Anger or rage, on the other hand, is characterized by a mass reaction towards the stimulating object. Both reactions require the expenditure of energy and the visceral responses are essentially the same in both. They involve increased medulli-adrenal secretion, inhibition of gastrointestinal motility, cardiac acceleration, peripheral and splanchnic vasomotor changes, dilatation of the bronchioles and increased ventilation of the lungs, liberation of sugar from the liver, stimulation of the sweat glands and erector pili muscles, pupillary changes, and so on, all of which may be regarded as factors in rendering possible the physical exertion which may be necessary in order to allow the natural impulse to prevail.

Central Nervous Mechanisms of Affective Behavior.—The results of not a few experimental studies carried out in an effort to localize the centers in the central nervous system through which affective behavior is mediated show clearly that these centers are localized in the diencephalon, particularly in the hypothalamus and the walls of the third ventricle. The chief centers for the regulatory control of the autonomic functions of the body also are situated in this portion of the diencephalon, which includes some of the most primitive diencephalic mechanisms and, in the lower vertebrates, constitutes the highest regulatory center, not only for the visceral functions, but also for the coordinated somatic reactions. In the experimental studies of Bard (1928), carried out on cats, typical sham rage developed regularly after removal of all parts of the forebrain above the middle of the diencephalon and after ablation of the dorsal part of the thalamus. It failed to develop, however, after separation of the ventral and most caudal portions of the diencephalon from the midbrain. The results of these experiments seem to warrant the conclusion that the expression of rage is dependent on the integrity of centers located in the ventral and caudal portion of the diencephalon. The manifestations of other affective states, doubtless, also depend on the integrity of this portion of the brain stem.

Stimulation of Affective Centers.—The diencephalic centers through which the emotional reactions are carried out probably are stimulated by afferent impulses of any kind which reach the thalamus. This is suggested by the wide variety of peripheral and visceral stimuli which elicit emotional responses. For example, Watson (1925) has shown that loud sounds and indications of loss of support are the natural stimuli for the reaction of fear in infants. Limiting or hampering the freedom of bodily movements in infants is a natural stimulus to rage. Tickling of the skin in children as well as adults, likewise, commonly provokes laughter. Anxiety or distress may result from impulses received through the special sense organs or from impulses arising in the viscera by reason of visceral dysfunction. Indeed, emotional states may be induced by impulses reaching the diencephalon through almost any set of afferent nerves. Our emotional reactions, furthermore, become still further complicated by the conditioning of indifferent stimuli. For example, if a given object which of itself arouses in the baby a pleasurable emotion is presented repeatedly, but at the same time a loud sound is made, the baby manifests fear; the object has become a conditioned stimulus for the fear reaction evoked by the loud sound. Thereafter the baby manifests fear whenever the object in question is presented. In ways similar to this, indifferent circumstances of an emotion may become effective stimuli for the renewal of the emotion even in the adult, particularly in individuals of unstable emotional balance.

Conduction Pathways Employed.—The afferent pathways through which impulses arising at the periphery reach the diencephalon are well known. For example, all exteroceptive impulses from the general body surface are mediated through the spinal and trigeminal lemniscus systems. Impulses arising in the skeletal muscles, tendons and joints are conducted through the medial lemniscus system. The pathways in the central nervous system which convey visceral

afferent impulses to the thalamus are less clearly defined. They probably are made up mainly of short neurons with frequent relays in the gray matter of the spinal cord and medulla oblongata. Our knowledge of the efferent fiber tracts through which impulses emanating from the centers in question in the diencephalon are conducted to the visceral and somatic efferent nuclei in the medulla oblongata and spinal cord as yet is meager. The data available at present indicate that some descending fibers emerge from the diencephalic nuclei in question through the periventricular system; others probably take a more direct course through the ventral portion of the diencephalon. In the lower levels of the diencephalon, according to Isenschmidt and Schnitzler (1914), descending fibers from the tuber cinereum are widely scattered throughout the ventral and medial portions of the cross section. According to Beattie, Brow and Long (1930), experimental lesions of certain of the hypothalamic nuclei are followed by descending degeneration into the spinal cord, indicating that the tracts in question pass partly into the reticular formation of the brain stem and partly into the intermediolateral cell column in the spinal cord. These descending fibers are partly crossed, but mainly uncrossed. They lie along the lateral and ventral borders of the central gray matter in the mesencephalon and eventually become concentrated in the ventral portion of the posterior longitudinal bundle and the dorsal portion of the reticular formation in the medulla oblongata. In the light of these findings, and other physiological data, the existence of descending fibers in the medulla oblongata through which impulses emanating from higher centers reach the visceral efferent nuclei must be conceded. The existence of descending pathways in the spinal cord which conduct visceral impulses has been amply demonstrated experimentally, but the exact courses of these pathways and their locations in cross sections of the spinal cord as yet are unknown. These pathways probably are composed of short fibers with frequent relays in the gray matter, and do not constitute compact fiber bundles. Neither can it be assumed, on the basis of our present knowledge, that every visceral function which is subject to influences emanating from centers in the medulla oblongata and diencephalon is subserved by a distinct system of fibers in the spinal cord. No long fiber tracts for the conduction of efferent visceral impulses have been recognized as yet in the spinal cord.

Cortical Influence on Emotional Expression.—In view of the important role of visceral reactions in emotional states, it is important to point out that no visceral organ which is innervated solely through the autonomic nervous system is known to be influenced directly by impulses emanating from the cerebral cortex. It cannot be denied, however, that cortical processes, under certain conditions, influence visceral functions. It seems not improbable, therefore, that a particular cerebral state may bring about a corresponding change in the general irritability of the gray matter in the medulla oblongata and spinal cord and thus exert an influence on the segmental centers through which the visceral organs in question are supplied. On the contrary, the influence of cortical processes on visceral functions probably can be explained quite as satisfactorily on the basis of the indirect connections of the cortex with the diencephalic autonomic centers.

The somatic and visceral manifestations of emotional excitement differ with respect to their complete expression by reason of the fact that the skeletal muscles are governed by both the cortex and the diencephalon, whereas the visceral organs are governed only by the diencephalon. For example, we may laugh voluntarily (cortical laughter) or spontaneously (thalamic laughter) or voluntarily inhibit or suppress spontaneous laughter. On the contrary, we cannot accelerate the heart, inhibit gastro-intestinal motility or increase the sugar content of the body by direct voluntary effort. Reactions which are subject to both cortical and diencephalic control may be dominated either by the one or the other set of neurons, depending on both objective and subjective factors. Under the exercise of volition, the cortical neurons ordinarily predominate and hold the excited diencephalic neurons in check. Not infrequently such cortical inhibition is incomplete. For example, we often laugh or cry "in spite of ourselves." There is then a conflict between the higher and lower centers for the control of certain bodily functions which not infrequently results in incoordination and confusion. Since the visceral functions are not subject to cortical inhibition, the visceral concomitants of an effective state may prevail in the absence of decided external emotional expression. The cortical mechanism can neither initiate nor prevent those intense reactions in the diencephalon which increase the blood sugar, accelerate the heart, inhibit gastrointestinal motility or produce other changes in visceral functions characteristic of emotional excitement, except insofar as the visceral expression of the emotion may be modified by the repression of its external expression. The repres-

sion of an emotion, therefore, affects mainly its external manifestations. The cortical control of the outward manifestations of emotional excitement, nevertheless, results in less visceral turmoil than would accompany free emotional expression. The visceral manifestations of emotional excitement probably reach their maximum only when the external manifestations also are maximal.

Influence of the Suprarenal Glands on Affective States.—Strong emotional stimulation in general results in an excessive discharge of epinephrine and other hormones into the blood stream and the liberation of sugar in excess of the normal requirements of the body. Not uncommonly this results in temporary glycosuria. Energy is thus supplied for the muscular exertion which may be called for, particularly in emotions like fear or rage. Under existing social conditions this autonomic defensive mechanism, in a large measure, is held in restraint. It has been assumed by many that repeated activation of this mechanism, if unsatisfied by instinctive expression, may result in a morbid disposition. According to this view, the visceral reactions to emotional stimuli, in the absence of free external emotional expression, play an important role in the causation of affective disorders, particularly in individuals with an unstable or hyperirritable autonomic nervous system. Cannon and his associates, however, have shown that the output of epinephrine is increased by muscular activity, even though the muscular exertion be very slight. The visceral reactions to emotional excitement also persist for some time after the stimulus has ceased to act. This probably is attributable to the continued discharge of epinephrine brought about by the muscular exertion involved in the external manifestations of the emotion.

Since even slight muscular exertion calls forth increased epinephrine secretion, it seems highly probable that what takes place on a large scale in emergencies takes place on a smaller scale in the ordinary behavior of the individual. The marked increase in the output of epinephrine during emotional excitement, doubtless, is due to the muscular exertion involved in the external manifestations of the emotion. This has an important bearing on conduct during emotional stimulation as well as after the emotional stimulus has ceased to act, since it indicates the natural effect of the full expression of a strong emotion and emphasizes the importance of limiting that expression in order to avoid a persistent state of disquiet.

The Influence of Autonomic Dysfunction on Affective States.—In view of the important role of the autonomic nervous system in the visceral concomitants of emotional expression, it is evident that the emotional life of the individual is determined, in a large measure, by the reactivity and functional balance of the autonomic nervous system. The integrity of the autonomic system, however, is not essential to emotional experience. Cannon, Lewis and Britton (1927) have succeeded in removing both sympathetic trunks, from the superior cervical to the sacral ganglia, in cats, and keeping the animals alive and apparently healthy in the laboratory for many months. These animals, like normal cats, exhibited the external manifestations of rage in response to appropriate stimulation, but the hairs did not stand erect on any part of the body, nor did vigorous struggle result in an increase of blood sugar. Animals with the suprarenals, liver and heart wholly disconnected from the central nervous system also exhibited rage responses, but there was no discharge of epinephrine and no marked acceleration of the heart rate. The results of these experiments show clearly that emotional reactions to appropriate stimuli may occur in the absence of the usual visceral concomitants. There is no reason, however, to assume that the emotional experience of the individual, under these conditions, is the equivalent of that resulting from the same stimulus under normal conditions. It would be erroneous, nevertheless, to say that the feeling of the bodily changes which occur spontaneously in an exciting situation constitute the emotion. The existence of an affective state depends on the activation of the appropriate centers in the central nervous system. If the central neurons are connected with the peripheral effectors, the latter react according to their usual mode, otherwise the peripheral response fails.

The responses of the viscera to emotional excitement are too uniform to afford a satisfactory means of distinguishing between emotional states which, at least in man, differ widely in their subjective quality. For example, many of the visceral concomitants of anger, terror, anxiety, grief or deep disgust are essentially similar. The differential features separating one emotion from another, therefore, cannot be found in diverse afferent impulses arising in the viscera. Visceral changes characteristic of emotional excitement elicited by means other than

emotional stimulation, furthermore, do not produce an emotional experience. In experiments on human subjects carried out by Maranon (1924), injections of epinephrine in amounts sufficient to induce visceral changes characteristic of an emotion resulted in a state merely reminiscent of other times when the same visceral changes were noted, but produced no affective state. In general, afferent impulses arising in the visceral organs do not afford rich sensations based on functional changes in these organs. The great majority of visceral afferent impulses, particularly those emanating from the cardiovascular system, probably do not reach the threshold of consciousness. Afferent impulses emanating from the skeletal muscles probably affect the quality of affective feeling more profoundly. Forced laughter, however, does not produce real joy, nor does forced weeping produce real sorrow, as should be expected if the peculiar quality of the emotion were determined by the afferent impulses arising in effector organs. Head and his collaborators (1920) also have reported that the quality of feeling-tone is entirely absent from the sensations associated with appreciation of posture in patients with certain diencephalic lesions, although this quality if intensified in relation to other sensations, notably those resulting from certain tactile, auditory and thermal stimuli. The data available at present lend little support to the theory that the quality of an emotion or the emotional experience itself has its origin in afferent impulses arising in effector organs. The different emotional expressions are determined by the different combinations in which the subcortical centers involved react. The quality of the emotional experience probably is determined mainly by the same reaction patterns.

Although the visceral concomitants of an emotional state play but a minor role in determining the quality of the emotional experience, it must be conceded that visceral disorders may initiate subjective emotional reactions. Under certain conditions, abnormal affectivity, doubtless, may be initiated and maintained by autonomic dysfunction. On the basis of a study of 600 patients with psychoses, Claude (1925) concluded that the intensity and rapidity of the morbid periods in the psychoses seem to be proportionate to the excitability of the autonomic nerves. On the basis of an extensive study of gastro-intestinal reactions to emotions in patients with psychoses, Lueders (1928) advanced the opinion that protracted chronic emotionalism and morbid moods affect the visceral functions less and less, but exert their greatest damaging influence at higher levels, resulting in impairment of the mental and moral faculties and domination by uncontrolled emotionalism, obsessions and hallucinations. In view of all the data available, psychoses cannot be regarded merely as abnormal functioning of the brain or central nervous system. They represent changes in the entire individual. It may also be assumed that the mind, even under normal physiological conditions, is influenced by the entire body; consequently, psychical processes are not limited to the cerebral cortex. Affective behavior must be regarded as a function of the organism as a whole; consequently, the emotional life of the individual is determined in part by the functional state of the autonomic nervous system.

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DISCUSSION (*Abstract*)

Dr. L. L. Hill, Jr., Montgomery, Ala.—Undoubtedly the autonomic nervous system has many important functions with which we are not familiar. I should like to ask what peripheral or systemic effect would be expected from an alcoholic injection of the thoracic sympathetic ganglia.

Dr. Kuntz (closing).—I assume that Dr. Hill's question refers to the effect on the body as a whole of paralysis of a limited portion of the autonomic nervous system. In general, it may be stated that paralysis of any limited portion either of the sympathetic or the parasympathetic division of the autonomic system exerts a direct influence only on the parts of the body to which the fibers in question are distributed. For example, extirpation of the inferior cervical and first and second thoracic sympathetic ganglia, or alcohol block of the corresponding sympathetic nerves eliminates the vasomotor innervation as well as the innervation of the sweat glands of the upper extremity, neck and face on the same side. The data available at present do not indicate that such a procedure exerts an influence on the body as a whole except as blood pressure is affected by paralysis of the vessels in a limited area and as the regulation of temperature is affected by the cessation of sweat secretion in a limited area.

SUPERALIMENTATION*

By LEA A. RIELY, M.D.,
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Napoleon said that "an army travels on its belly". This is as true, as trite and pithy a saying now as when he first made the observation. Some individuals live to eat while some only eat to live. Food is that matter which we ingest into the body, which supplies tissue waste, produces energy, and thereby maintains heat in the grown up. In the preadolescent, material for growth has to be taken into consideration. Food, when ingested, undergoes a metabolism which completely changes its chemical and physical character. It is oxidized and hydrolyzed to make suitable pabulum for the body needs. Physiologists are of the opinion that in normal persons all the food ingested is absorbed, and therefore has to be used or destroyed.

Thanks to the biological and government chemists, foodstuffs have been extensively studied, until of the fundamental factors of nutrition we have an ever-increasing wealth of knowledge. "The law of the conservation of energy" is applied and energy and heat are expressed in terms of calories with as much accuracy as the energy requirement of a steam engine or a gasoline motor, and the calculations show more economy of energy in the body. Actually only about one-fifth of the energy value of the food appears as external work, that is, muscle work, but the body is more efficient than an ordinary steam engine in which a large amount of energy is dissipated as heat. Owing to the specific dynamic action of foods, we can estimate the needs of an individual by his size, his body surface, his age, sex and the type of work he expects to do with as much accuracy as the amount of a certain specification of steam coal to carry a ship from one port to another can be ascertained. The fuel requirement will depend on the individual's basal metabolism and his leaks from malfunctioning organs, which must be considered like a loss of steam or a faulty fire box in one's engine. This accuracy in knowledge of caloric values has been stimulated by the development of knowledge in treatment of diabetes. It is fortunate that the effects of diet were studied before the days of insulin, as otherwise this knowledge might not have attained its present high degree of accuracy. It was established when nutritional study was young that body heat and muscular energy obey the law of conservation of energy. The calory as a symbol of nutrition was designated, with the three elements of food, or "proximate principles", proteins, fats and carbohydrates yielding their quota of energy and repairing waste. Now the emphasis of study has changed from quantity to quality. Each day a new component of a balanced diet appears in the form of a new vitamin or a new mineral element. The chemist has been aided by the careful studies of the biologist in determining the foodstuffs which keep the body in equilibrium.

Like eugenics, nutrition will never be governed with mathematical accuracy. Gluttony or overeating will be with us always unless an economic factor steps into the breach. However, there is some regulatory mechanism that stimulates an appetite after brisk exercise or after a cold bath, exposure to cold, or a stimulus which raises basal metabolism. Superalimentation, like overdrinking, is a disease, and like other diseases should be classified as acute or chronic.

Acute overloading of the stomach is generally the result of previous fastings. In travel bureaus where meals are furnished the overzealous eater may make himself ill. Since he must rest afterwards, he eventually gets less than a more moderate eater who has a steady appetite.

The effects of gluttony are evanescent, like those of an acute debauch. A change of diet or some stimulus to the appetite such as an "apertief" or even pleasant company with enjoyable conversations, may cause an acute overindulgence. Samuel Johnson[1] dreaded overindulgence, and when the misfortune overtook him at his famous Cheshire Cheese he spent the following day in long tramps through the beautiful English countryside, and in his own words "forsook all ye rich and heavening foods". Overfeeding is a relative question: what is overfeeding in one person may not be injurious overfeeding, though it be a superfluity, for another. The number of calories for basal maintenance of a man in bed would not do for an ambulatory man; a man in the tropics with little dissipation of heat would not be a yardstick for a man doing hard manual labor, especially in the Arctic region. The type of food would also be quite different, with carbohydrates predominating in the tropics, and fats and proteins in the Arctics. The daily caloric intake would vary from 2,000 in certain cases to 6,900, which may be the ration of members of a football squad

*Read in Section on Medicine, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

in active training. A recent article on the changing diet of the American people[2] shows the Lucullian feasts which our forefathers indulged in, which vied with the tables set before royalty. Meats formerly dominated the regimen, but modern statistics indicate an increasing consumption of dairy products, fruits and vegetables.

There is evidently in normal man some regulatory mechanism which balances appetite and desire for physical exertion.[3] Unconsciously a man who eats too much feels the need for a little more exercise, and he takes it; or if his activities are restricted his desire for food is lessened. Temperature is victu vitae sedentariae. When this safety valve action is obtunded in some persons, unconstrained appetite has its way, and we get the chronic type of overeating, which leads on to obesity. Normal individuals eating from 500 to 800 calories above their basal maintenance, particularly with a lazy disposition, a happy-go-lucky phlegmatic temperament, will put on from eight to twelve pounds a year, or eight hundred or twelve hundred pounds in a hundred years. Advancing years with lessened activities, both mental and physical, with possibly the aid of some of the endocrine organs, add their quota to the extension of the waist line. Newburg[4] thinks that obesity is altogether a matter of overeating and that reducing the quantity of food and exercising the patient will bring him back to an estimated weight. I certainly concur with him. Frank Evans, with his low diets of 800 calories or less, but with protein balance, shows a very practical and satisfactory way to get away from the baneful effects of obesity in normal and pathological states. Bauer's[5] studies on obesity show the dangers of endocrine diagnosis. Washington Irving, who facetiously describes the honorable Peter Stuyvesant, the big fat ruler of Manhattan, "His cheeks exact a very generous toll of every morsel of food passing by his lips", evidently does not believe in endogenous obesity.

In the study of political economy we deal with the law of supply and demand. In the realm of nutrition we have a parallel problem. Granting a sufficient supply of savory food we must also have appetite and hunger. We get hunger in the normal individual, polyphagia in the diabetic or in pancreatic deficiency, in cases of intestinal parasites, a patent pylorus, in voracious animals and in a pregnant and lactating woman or the bulimia or pica in the psychiatric.

Carlson says:

"When a distinction is made between bulimia and polyphagia the latter is used to mean the excessive ingestion of food, that is, an absence of the sense of satiety or sensation of fulness, rather than an abnormally intense hunger sensation."

Haller says, among animals, those having the shortest span of life are the most voracious eaters. The caterpillar eats and defecates almost continually. Certain mental and nervous troubles that are imperfectly understood are characterized by an inordinate augmentation of hunger, eating and ingesting of unusual and indigestable substances, which is called bulimia, and where the appetite takes on a perverted aspect, it is called pica.

Carlson draws a distinction between appetite and hunger. He claims that certain drugs produce an appetite, but that no known remedy will produce hunger. Hippocrates, in one of his aphorisms, says "Strong wine cures hunger". In the every day life of adults who have access to a liberal food supply the memory of appetite is probably a greater factor in the ingestion and digestion of food than hunger. Short intervals between large meals do not permit the development of strong hunger unless the individual is engaged in hard physical labor. Under these circumstances appetite and habit supplant hunger as nature's dietary guide. When food is made sufficiently palatable we may consume large quantities, especially if we have formed the habit of giving marked attention to the pleasures of the table.

Hunger is relieved by a volume of sometimes indigestible food, yet may not be appeased with less of a more nutritious and concentrated food. Hunger is increased by hyperacidity, as in ulcer of the stomach, yet the colon dyspeptic is a small eater.

Polyphagia in the diabetic is caused by the inability to store up and utilize the carbohydrate consumed, or by the lessened amount of sugar available for the use of the tissues because it has been oxidized or eliminated by the urine in a wasteful manner. In the condition of hyperinsulinism, inordinate hunger is due to the drain on the blood sugar, which depletes the supply before the usual time of eating has come around. Wilder's patient in the Mayo Clinic had a hypoglycemia so intense that in order to prevent collapse and shock it was necessary for him for weeks to take food every 2 hours, and for a time every ½ hour, and as much as 1,000 grams of cane sugar daily, because the anlogs of islet carcinoma had metastasized in the liver. This condition was first called hyperinsulinism by Dr. Seale Harris.[6] Allen's paradoxical law

states that the more carbohydrates the normal person consumes the more he can metabolize and store, while the more the diabetic eats the less he can care for, because the internal pancreatic secretion is insufficient for utilization of necessary carbohydrates and is soon exhausted.

When the external secretion of the pancreas is deficient, food may be in the body but not of it, and necessarily a big diet is inert and like a foreign body within the alimentary canal.

The thyrotoxic patient eats much, metabolizes his food well, but because of the increased basal metabolic rate he eats and grows thin. Relieve the hyperactivity of the thyroid gland and lower the basal metabolism, and he immediately picks up weight.

Carlson[7] transfused 20 to 50 c. c. of blood from animals with pancreatic diabetes and the typical polyphagia into normal animals. The results were practically identical with those of transfusion of the blood of starving animals, that is, there was a temporary stimulation of gastric hunger. They proved that it was not due to acetone bodies in the blood, hence they think it is clear that the stimulating action in showing a diabetic blood on the hunger mechanism is not due at least directly to acetone bodies.

Graves, in 1848, asked that the epitaph to be placed on his grave say: "He fed fevers". We now give our typhoid patients 3,500 or more calories daily, chiefly of carbohydrates, because they are more easily taken, they are metabolized more rapidly, and the patient with their aid increases his resistance to the infection, the course of fever is shorter, the complications are less frequent, the period of convalescence is shortened, and he actually gains weight even with a high metabolism.

The same may be said of the empyema and abscesses of the lung as well as tuberculosis and other leucopenic infections. It is not true of conditions with leucocytosis such as pneumonia and blood stream infections, as in these cases there is a diminished ability to metabolize food and even a repugnance for it.

Dr. Icie G. Macey,[8] of Michigan Research Laboratory, says:

"It has been observed that lactation increases the food demand approximately 60 per cent over and above that of pregnancy".

Calory overfeeding has not been demonstrated to be advantageous to the cow or to women, but a woman taking 4,300, 4,600 and 3,800 calories of a ration of 15:37:48 per cent of protein, fat and carbohydrate secretes milk containing approximately 2,100, 1,500 and 1,120 calories, respectively, and is thus left 2,000, 3,000 and 2,600 calories for daily maintenance, a parallel not different to the diabetic's loss of stored energy and heat.

The pregnant woman with a voracious appetite and abnormal craving for strange dishes can be explained by the same etiological factor as the psychotic patient and, according to some writers, vomiting of pregnancy may be similarly explained.

Since physiologists are agreed that in normal persons all the food eaten is absorbed, and therefore has to be used or destroyed, an excessive and pathologic burden is thrown on the chronic overeater. Albutt[9] says that a good cook is more to be feared when one is in perfect health than a bad physician when one is ill.

We have been slow to realize the effect of overeating on the heart and arteries, the pulmonary, renal and gastro-intestinal tract with its accessory digestive glands. In keeping with the trend of modern times, we physicians are due to prevent as well as cure disease, and if obesity is not a disease it is certainly an unhealthy bodily condition. Many think that temperate eating has been a potent factor in our diminished death rate since the depression. A lessened resistance to intercurrent disease is especially noticeable.

The surgeon looks askance at the obese patient. The internist sees him as an extra hazard because when he is febrile or fasting he breaks up his fat into fatty acids with resulting acidosis. The insurance actuary finds that he cannot write these patients at an equal rate with the normal or underweight person, so he is a marked man wherever he turns. Seckell[10] believes in the trilogy of gout, diabetes and obesity. It is universally conceded that overfeeding is one of the causes of gout, either in the individual or in successive generations. It breaks down the metabolic processes that cause uric acid destruction. Gout is to the arteries as rheumatism is to the heart (Honchard). Watering places can attribute their success more to the limitation of diet, especially animal proteins, to increased exercise and mental relaxation and flushing out of stagnant emunctories than to the various mechanical and electrical devices.

Paullin, Joslin, and others have shown the preponderance of cases of diabetes among the obese with a blood sugar tolerance curve approaching that of the diabetic. Yet relieve the obesity and the curve returns to normal. The presence of fat among the acini of the pancreas

may limit the amount of its secretion. The blood and metabolic rate show no abnormality at first.

The blood and metabolic rate does not show any abnormality. Now once pathological physiology begins the metabolites of carbohydrate, fat and protein produce a deleterious effect on the arterial tree, so that the various tissues are damaged thereby, and the older the diabetic the more chance he has for a varied clinic.

Dublin, statistician for the Metropolitan Life, says:

"Expressed as percentages of the death rate of normals overweight as a group, diabetics have a mortality two and one-half times in excess of normal, but extreme overweights have a mortality nearly eight times the normal, and thirteen times the underweights. The underweights' mortality from this disease was only 64 per cent of the rate among normals. In the later involuntary period of life, in the excessive overweight, the rate is over eleven times the rate for normal, or twenty times the rate among underweights."

Most hyperpietics are of a ruddy hue and plethoric. There is a reversionary process when their diet is cut and they are given mental rest. Virchow, and later Aschoff, called attention to the relationship between cholesterol and arteriosclerosis and the reversionary process when the cause was removed. Some explain it on the ground that in the presence of high cholesterol the cells have stronger affinities for protein, less for carbohydrates and least for fats. Metchnikoff and others explain it as due to the production of poisonous substances in the intestinal tract by a hostile intestinal flora. They have looked for pressor substances in the blood stream. Others believe the fault lies in the liver, which fails in its detoxifying function, but as yet there is no unanimity of opinion. There is a uniformity of opinion as to the destructive effects of hypervitaminosis from irradiated ergosterol, and animal experiments show its pathological effects on the arteries.

Albutt formerly, and Minot and Murphy later, have shown the effects of producing a physiological polycythemia by meals rich in protein and liver, which may eventually "cause an abiding plethora vera". And here venesection and purgation help to relieve the plethora which slows the mental action, and aid in restoring the physical prowess.

In gluttony plus alcoholic excesses the plethora is toward the venous side, so verily the glutton digs his grave with his teeth. Again quoting from Dublin:

"The excessive mortality from organic heart disease among overweights occurred through adult life, although it was less marked at the younger ages. The angina pectoris among older overweights is twice that for normals, and among the heavier weight men two and one-half times the normal. Disease of the arteries, too, showed a high death rate among overweights. The death rate for overweights was nearly 75 per cent in excess of the normal, and over twice for that of underweights. Cerebral hemorrhage stood third among causes of death of overweights. It was 57 per cent higher than among average weights and over twice that of underweights. The highest mortality was in extreme overweights."

Plato sensed the danger when he wrote in The Republic:

"And do we not hold it disgraceful to require medical aid, unless it be for a wound or an attack of illness, incidental to the time of the year—to require it, I mean, owing to our laziness and the life we lead, and to get ourselves so stuffed with humors and wind, like quagmires, as to compel the clever sons of Asculapius to call diseases by new-fangled names?"

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DISCUSSION (*Abstract*)

Dr. C. H. Cocke, Asheville, N. C.—The fact that the degenerative disease group is showing an increasing death rate is ample warrant for Dr. Riely's calling our attention forcibly to the dangers of obesity. One would like the solace of belief in the efficacy of the depression (still upon us) to make the American public cut down on its calories; but if it has had any such effect as yet, it has passed unobserved by me.

While definitions and classifications are generally essential for the elucidation of any disease group or entity, I take it the essayist has preferred to limit discussion entirely to alimentary obesity; and, consequently, I shall also confine my remarks within the same limits.

The patient suffering from alimentary obesity obviously eats more than he needs. He not rarely, but all too often, exercises much too little, the result, of course, being either a relative or absolute excess of intake and its accompanying increase in weight. Here one's environment and home habits, as well as his temperament and character, must be taken account of. The lazy, easy going, phlegmatic, unambitious, unenergetic person in a home given to a liberal dietary, with a business not too exacting in effort and energy, will almost inevitably slip into habits of overeating, and consequently will soon be overweight.

The patient's age, I feel, is here an important factor; and the internist can find no better text for preachment than the dangers of those approaching the forty year mark of superalimentation, particularly as it is all too often accompanied by a slowing of physical activities and regular exercise. It is sometimes a bit

difficult to convince the patient that the added 100 or 200 calories induced by the daily and fairly constant attention to the "appetizer" (which has become so popular in these days of prohibition) in the end add to the burden of his weight. The dangers of diabetes in those of overweight have many times been stressed; the folly of overfeeding in hypertension would hardly seem necessary for remark; and yet I doubt seriously that the lay public appreciates fully the seriousness of overeating in even mildly damaged myocardiums.

In 1924, there was presented before this Section a beautiful demonstration by Dr. K. H. Beall of the extra work entailed upon the heart of the obese. Miles of extra capillaries to feed many pounds of excess fat must necessarily overtax an already overburdened heart muscle.

Time does not admit of any detailed discussion of what to do about obesity. Suffice that it is just as much of a medical problem as the treatment of any other chronic ailment; that it must be undertaken only after a careful survey of the patient and his caloric requirements, his habits, activities, and age, and that excessive zeal is apt to spell disaster. No method which fails to keep the body in nitrogen equilibrium can succeed. The effort must be to make the patient burn his own fats, but spare his body protein, and on no account must there be allowed a mineral or vitamin deficiency. Nor can one omit a consideration of water metabolism, since disturbance in water and salt metabolism, with storage of water in the tissues, may be maladjusted; and remedial efforts must take account of these factors. With Evans I agree that the administration of thyroid is not only largely unnecessary in the treatment of these cases, but not infrequently it is quite definitely contraindicated.

Dr. Seale Harris, Birmingham, Ala.—Dr. Riely mentioned superalimentation associated with hyperinsulinism and also discussed obesity and diabetes. Insulin, if given hypodermatically (induced hyperinsulinism) will stimulate appetite, and used with superalimentation will increase weight in an undernourished individual. That is well known. It is not so well known that the spontaneous excessive secretion of insulin (hyperinsulinism) is a definite disease entity, a symptom of which is hunger, so that the individual who has hyperinsulinism eats excessively and often between meals. The more he eats, particularly of the rapidly soluble carbohydrates, particularly cane sugar products, which stimulate insulogenesis, the greater the degree of hypoglycemia two or three hours after meals when more food is needed to prevent a spontaneous insulin reaction; and so obesity results. A damaged pancreas from a previous infection, perhaps years before, is probably the most important etiological factor in hyperinsulinism, as it is in diabetes; and the overworked islet cells become exhausted and a deficiency of the secretion of insulin (hypoinsulinism) diabetes mellitus, the antithesis of hyperinsulinism follows. In other words, first a pancreatitis, followed by excessive secretion of the islet cells (hyperinsulinism), then superalimentation, which exhausts the islet cells, then diabetes.

Several of my first patients with hyperinsulinism were overweight and had a history of glycosuria which suggested that hyperinsulinism may precede diabetes mellitus, just as hyperthyroidism sometimes is followed by hypothyroidism (myxedema); and in a symposium on diabetes, in which I discussed the etiology, at the meeting of the Virginia State Medical Association in 1923, I expressed the opinion that hyperinsulinism associated with obesity was one of the causes of diabetes. Since then I have regarded my hyperinsulinism patients as potential diabetics and have dieted them accordingly. In the last few years, on careful questioning of my diabetics, particularly those who were overweight before developing diabetes, a number have given a history of excessive hunger and a feeling of weakness and nervousness between meals, requiring food for relief. In one of these cases the history was so clearly that of hyperinsulinism that it cannot be doubted that she had spontaneous hypoglycemic reactions before becoming overweight, and later developed diabetes. She said: "Two or three hours after meals I became so hungry, weak and faint that I thought I would die if I did not get something to eat. Therefore I was eating all the time." She also said that she almost collapsed if her meals were delayed. She was underweight until she had those symptoms, when, on account of her excessive appetite and eating between meals, she became overweight, developed polyuria, nocturia, pruritis vulvae, weakness and loss of weight; and it was found that she had diabetes. Her blood sugar curve after a glucose tolerance test is typical of a moderately severe case of diabetes. She is an intelligent woman and learned to calculate food values and maintains her weight and health on 135 grams of carbohydrate, 60 grams protein and 150 grams of fat a day and 10 units of insulin three times a day. She has had several insulin reactions, which she says affected her exactly as the "hungry, weak spells" she had before developing diabetes.

The familial tendency to diabetes has been observed frequently. It is interesting to note that this diabetic mother has a son who is underweight and has developed practically the same symptoms of hyperinsulinism that his mother had before she had diabetes. He is a minister and on Sundays he became exhausted and extremely nervous and ravenously hungry before finishing his Sunday morning sermon; but was revived physically after eating dinner. During the week he had the same symptoms, but he ate between meals and his weakness and nervousness were not so pronounced as on Sunday when he could not get food. His blood sugar curve after 100 grams of dextrose is the typical "flat" curve of hyperinsulinism. On a low carbohydrate, moderate protein, high fat diet, with orange or tomato juice every two hours between meals, his symptoms have been controlled. I believe that this hyperinsulin son of a diabetic mother is a potential diabetic.

I have had a number of cases of hyperinsulinism with sugar constantly in the urine, even though the blood sugar levels were very low, in one case 0.050 per cent. It therefore seems possible that the glycosuria in such cases is of pancreatic origin instead of being due to a "low renal threshold." I also have had several cases of dysinsulinism, in which at times there was hyperglycemia with glycosuria, and at other times hypoglycemia; and in others the glucose tolerance curve shows a low fasting blood sugar, then hyperglycemia for three or four hours, and in five or six hours it falls to a very low level. Such cases suggest the relationship of hyperinsulinism to diabetes. It therefore seems probable that the superalimentation of hyperinsulinism may be a factor in the etiology of diabetes; and that by diagnosing the disease and placing the patient on a low carbohydrate, moderate protein, high fat diet, with frequent feedings, diabetes can be prevented.

SINUS INFECTION IN CHILDREN*

By G. S. OSINCUP, M.D.,
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In presenting this paper I wish it to be understood that I do not consider myself to be an authority on sinus infection in children. I have been observing over a period of years a surprisingly large number of children suffering from what careful investigation has revealed to be infection of the paranasal sinuses complicated in most instances by secondary manifestations. Upon inquiry among my colleagues I discover that many of them are encountering this same high percentage. They, like myself, have come to realize the lamentable scarcity of information regarding this condition and the surprising lack of literature concerning its treatment. In fact, until most recent years it seems that sinusitis in children either did not exist to any great extent or was almost entirely overlooked by both pediatrists and rhinologists.

In the past few years these specialists seem to have discovered that there is a large number of children who are showing symptoms referable to the sinuses. There is still, however, quite an astonishing lack of information as to the proper therapeutic measures to be followed in their treatment.

It is my purpose to put before you my experience with this condition, together with my methods of treatment, and I hope that the ensuing discussion will be enlightening to others as well as to me.

The formation of the sinuses is not by any means complete at birth, the antra and the ethmoids being the only ones present at this time in most cases. The sphenoids and the frontals develop as the child grows until between the fourth and the seventh or eighth year they are probably complete. Needless to say, changes in size and shape continue until puberty and beyond. The sinuses may become infected at any time and very frequently are. There may be abnormalities due to allergy, but infection is not commonly encountered before the third or fourth year. From this age on, it occurs in increasing numbers into adult life.

The fact that the frontal, anterior ethmoid and maxillary sinuses all open within a very small area in the middle meatus predisposes greatly to infection one from the other.

Etiology.—Of all acute diseases, I believe influenza to be the most important etiological factor. Next is the ordinary cold. Then come tonsil infection, adenoids and allergy. Whether the enlargement of the turbinates is an etiological factor or is a result of the sinus involvement is a question in my mind. If it is etiological, then it must be the commonest of all such factors, as it is certainly true that this is the commonest of all local signs found in children suffering from sinusitis. For this reason, it must be given careful consideration in every routine examination. If, on the other hand, this enlargement is one of the results of the sinus infection or is a component part of it, then we should have many cases of infection entirely without other signs or symptoms. This, I do not believe to be true. Swimming pools are probably the cause of a large percentage of these infections. In Florida, where lake swimming is universal throughout the year, we have many infections, particularly during the warmer months, when the incidence of sinusitis should be lowest. After every influenza epidemic we have an enormous increase in the number of children suffering from this condition. The exanthemata are many times the predisposing cause. Malnutrition or any condition causing a lowered resistance must also be considered an etiological factor. Infrequently sinus infection may result from a deviated septum or other malformation.

Symptoms.—There are certain symptoms which are more or less constant in all these cases. Sneezing, particularly upon first arising in the morning, is probably the most universal of these. Interference with nasal breathing is nearly as common. Coughing early in the morning, of a type which is at times almost paroxysmal, is frequently encountered. This is due to the fact that the thick muco-purulent discharge from the infected sinuses drops back into the nasopharynx when the child is reclining and after a certain amount has accumulated he coughs until this is loosened and swallowed. In the older child, six years and up, headache, frontal in type, is usual. This is not so severe as in the case of adults, but is nevertheless present to an annoying degree. It is unfortunate that many parents regard this complaint as a figment of the child's imagination or attribute it to defective vision. It has been my experience that when a child of this age complains of headache diligent examination will reveal that he has a pathological condition to account for it and that he is, in reality, suffering. In chronic cases, a low grade temperature ranging

*Read in Section on Pediatrics, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

from 99 to 100° is frequently found, while in acute cases it may range much higher. Anorexia, abdominal distress, and occasionally nausea are often encountered. These particular symptoms seem to be due in most part to the fact that the child swallows a large quantity of mucus almost continuously. Anemia, malnutrition and listlessness are often encountered.

Diagnosis.—History of a recent respiratory infection, together with any of the above symptoms, should lead us to suspect a sinus infection and to make a careful examination for it.

Inspection of the nose will usually reveal large round boggy turbinates either unilateral or bilateral, frequently with a mucopurulent discharge bathing them. Inspection of the throat will show this same discharge dripping down out of the nasopharynx. Transillumination will often reveal a cloudiness of one or more of the sinuses, and x-ray by a competent roentgenologist will show the source of the infection. In acute cases definite cloudiness is usually observed. Expert knowledge of the normal anatomy and the giving of due consideration to the frequent changes in the developing child is essential to proper interpretation of the plates. However, I believe it is a mistake to depend too much upon the x-ray examination in chronic cases, as many, particularly of the younger children, do not have a sufficiently diseased tissue to show a definite cloudiness. In all chronic cases an allergic condition should be suspected and a nasal smear examined for an increase in the eosinophils which, if found to be over 10 per cent, should definitely place the condition as primarily an allergic one.

Complications.—Extension of the infection locally may cause an involvement of any of the surrounding tissues. Almost any other of the secondary infections such as adenitis, otitis media, arthritis, pyelitis, nephritis, endocarditis may complicate a sinusitis. It is of the utmost importance that in the search for a focus of infection the sinuses should be given the most careful examination possible.

Treatment.—The allergic sinus disease should be treated by employing skin tests to determine the offending agent or agents. Having determined what these are, either keep the child away from contact with these or immunize him to them. These children should also be given vaccine in an attempt to prevent them from catching cold and in certain cases change of climate is to be recommended. In the non-allergic cases, treatment is local, general and surgical. Many lines of local treatment have been recommended, but most of them fall far short of perfection.

Shrinking the nasal mucosa with ephedrine, followed by the use of one of the silver preparations, and in the case of old children, irrigation, seems to produce as good results as any. The use of silver packs in the nose has been in my experience very disappointing. Ephedrine, if used over a period of a few weeks, not only loses its effect, but seems to become an irritant. It is wise, therefore, to alternate its use with that of a bland oil.

The use of an autogenous vaccine or even some of the better stock vaccines has been very successful in my hands if accompanied by the other procedures. I believe it should be used in all cases not only as a curative agent, but as a means of preventing subsequent infections. The ultraviolet light used over the entire body for a period of two weeks to a month seems to be of the utmost value. Overdoses, however, should be carefully avoided. Vitamins A and D with calcium are to be stressed. Needless to say, the diet should be carefully regulated. Internal medication is not of much value with the exception of those things used to combat the anemia and loss of appetite.

Removal of infected tonsils and adenoids is essential and the clearing up of any other foci of infection must be undertaken. The treatment commonly carried out with adults, I believe, is entirely too strenuous to be employed with children. Probing the sinuses with frequent shrinking of the mucosa and suction is, in most instances, too nerve-wracking for the child and should be attempted as infrequently as possible.

It seems to me that climate has been greatly over-stressed in sinus infections in children. While it is certainly true that the chances of reinfection are very appreciably lessened by removal to a climate where respiratory infections are fewer, still I believe that we have fully as many cases of sinusitis in our warm sunny Florida as there are in the North. However, a change from the coast to the inland or vice versa will cause an improvement in many cases, though why this should be true I am at a loss to say.

Though I know there is still much room for improvement in this treatment, the great majority of cases will respond more or less satisfactorily to that outlined above.

Surgical intervention is in the great majority of cases entirely unjustified. Of course, in those cases of involvement of antrum accom-

panied by polypoid growth, nothing else can be done. Surgery of the turbinates and septum in a child before puberty is a very uncertain and in most cases a very unsatisfactory procedure.

We have progressed a long way from the days when the existence of a paranasal sinusitis was either ignored or denied. More and more it is being recognized, even though it is still all too often overlooked. Our treatment has not progressed as rapidly as our diagnosis. Many adults are probably suffering from and being treated for infections that have existed since early childhood, and when I say suffering I mean it literally. There are few conditions more annoying, more aggravating or more painful. Prevention, early recognition and vigorous treatment should be our watch words when dealing with sinus infection.

Prevention.—Maintenance of a free flow of air through the nose and nasopharynx, complete drainage of the sinuses, particularly during infection of the upper respiratory tract, will prove of the utmost value. Correction of nasal deformities, removal of adenoids and infected tonsils, early recognition of an allergic nose and the use of extreme care in preventing infections from outside sources, particularly when swimming, are all measures which should not be neglected by the pediatrician.

This paper is not a scientific treatise, but it deals with a subject which must be of prime importance to every physician dealing with children. The frequency with which sinus disease is encountered and the scarcity of literature as to its treatment justify a discussion at every opportunity.

DISCUSSION (*Abstract*)

Dr. Oliver W. Hill, Knoxville, Tenn.—I am grieved to hear a Floridan admit that there is such a plague as sinusitis in the "land where it is always June."

We have had favorable results in sinusitis from packing the nose with various antiseptics. We have tried the silver preparations such as neosilvol and argyrol, and metaphen 1/2500 in oil or water. We do not know which is the most efficacious. We are of the opinion that a subacute or chronic ethmoiditis causes a continuous absorption and contiguous inflammation of the nasal passage, with the well known attendant symptoms.

We must not lose sight of the general physical condition and personal habits of the little patient. We have had excellent results with vaccines, both stock and autogenous. We have also had some dismal failures with these remedial measures.

Dr. Roy E. de la Houssaye, New Orleans, La.—I feel that too many physicians are using surgery on young children. My plan of treatment is the use of a hand nasal suction bulb, keeping the nose open with ephedrine to allow free drainage, sunshine, fresh air, and keeping the general health up to the highest level. Operation is the exception.

Dr. Edward Clay Mitchell, Memphis, Tenn.—Dr. Osincup has shattered one of my fondest illusions, as I have considered Florida the Mecca for sinus sufferers.

Dr. Shea and I have been interested in paranasal sinus infection for fifteen years. These cases come first to the pediatrician for conditions entirely foreign to the nasal tract, such as pyelitis, capricious appetite, nervousness, arthritis, obscure temperature; and the sinus infection is found only after a complete investigation.

The practitioner should have a complete knowledge of the anatomy and development of the paranasal sinuses. The sphenoids are present at birth, as well as the antra, or maxillary sinuses, and the ethmoids. All of these gradually develop until puberty, the antra especially developing until adult life. The frontal sinuses do not begin to develop until about the eighteenth month. Their development comes from the migration of the ethmoid cells into the frontal bone. Thus, the growth and development of the frontals depend on the disease or injury that the ethmoids suffer. For this reason we can tell fairly well at what time the infection of the ethmoid sinuses began by the roentgenograms. A shadow over the antra and ethmoids means infection, or thickening of the membranes. If there are well developed frontals, the condition is probably acute or allergic. Hence, our idea has been that the topography of the sinuses is the determining factor in diagnosis.

Our treatment could be summed up as consisting of two factors, namely, the drainage of pus, particularly in the maxillary sinuses; and second, all methods to raise the resistance of the patient, as vaccines, cod liver oil, sunshine and diet. In only two instances have we resorted to radical surgery. The surgical treatment consists in thorough drainage of the sinuses. The old saying, "Once a sinus, always a sinus" is in no way true.

We have been fortunate in being able to follow by means of x-rays taken once a year cases for a period of eight or ten years. Beginning at the ages of eight or nine years the little patient has shown infantile or non-developed frontals, and the other sinuses are poorly developed. At the age of eighteen a perfectly normal set of sinuses is demonstrated.

The function of the sinuses should be briefly mentioned. There are two functions: first, that of ventilation of the skull, and second, since the sinuses are lined with lymphoid tissue we feel that they assist the tonsils and lymph nodes in this region in combating infection. For this reason, the removal of healthy tonsils, especially in the young child, undoubtedly throws the extra load on the sinuses and predisposes to sinus involvement. Most of our failures in the treatment of sinus infection we must attribute to allergy. The treatment of sinuses in the allergic individual will raise the resistance of the patient, but will not cure the allergy.

Sinus infection is a problem for the pediatrician and the general practitioner. There is no royal road to diagnosis as has been intimated in a recent article. The diagnosis can be made only by a careful study and the patient is relieved only by the combined efforts of the rhinologist and the general practitioner.

Dr. Jno. J. Shea, Memphis, Tenn.—The sinuses grow according to a definite plan, but reflect in their growth the infection they have experienced. In the infant,

the adenoid is the most active tissue in the process of auto-immunization against upper respiratory infections. The tonsils reach the height of their immunizing ability in the child, and, as the adenoid and tonsils recede, the paranasal sinuses assume a very important roll in the immunization and active combating of upper respiratory infections. In the child whose tonsils and adenoids have been removed at an early age, the sinuses are called upon too early and readily succumb to the infection they are fighting. One severe infection, or multiple mild infections, will arrest the growth of the sinuses and produce a persistent infantile set of sinuses. These immature sinuses are incapable of maintaining immunity against the infections of their environment, with the result that the sinuses become the focus of infection and a source of supply of discharge. This discharge, if absorbed by the mucous membrane of the sinuses, migrates into the lymphatics of the chest and produces the sinus chest. If it spills over into the nasal pharynx and is swallowed, it reduces the acidity and diminishes the digestive elements within the stomach. The best results in the care of sinus patients are obtained through the application of the above knowledge.

If the development of the sinus has been arrested, its ostium is closed and in this case the opening into the antrum should be dilated. The antra are normally sterile and when a bacterial growth is obtained within its cavity this is abnormal. If this culture grows in the specimen of the patient's blood, it may be deduced that the resistance to this organism is low and the administration of an autogenous vaccine will give beneficial results. If the antrum is filled with pus and local treatment does not clear it, then it should be drained and the best method in our hands is by making a small naso-antral window and through this inserting a rubber catheter for continuous drainage. Usually at the end of four days the catheter may be withdrawn, at the same time irrigating the antrum of any residue contained within it. Radical surgery is seldom indicated in children except for the removal of tumors.

Dr. Frank B. Schley, Columbus, Ga.—Sinus infections in infancy and childhood are being recognized by pediatricians as a frequent disease of this age rather than a rarity. In the diagnosis of infection of the maxillary antrum I have had very little help from transillumination, except in one case of a boy eight years of age who was profoundly sick and toxic in appearance from an infection of the right maxillary antrum. This case was easily detected by transillumination and almost immediately cured by surgical drainage, but I have had several others in which transillumination has been negative in the hands of a good nose and throat man, but on x-ray an infected antrum very plainly showed, the treatment of which relieved all symptoms. I have been told and have read that an infection of the sinus alone will not produce a fever, but in my own past experience long continued fevers of undetermined origin have been fully explained and cured by the discovery and treatment of an infected sinus. I shall never forget the case of a five-months-old infant with an abscess of the left upper central incisor tooth bud which continued to drain, accompanied by high fever, until the left maxillary antrum was surgically drained of thick pus. Immediate healing of the tooth bud area and cessation of fever then took place. We pediatricians must not overlook the sinuses in our search for the cause of obscure fever and frequent colds.

URGENT ABDOMINAL SURGERY IN THE AGED*

By ISIDORE COHN, M.D.,†
New Orleans, La.

Urgent abdominal surgery in the aged differs in many respects from like surgery in the young adult. It is a well recognized fact that surgery at the extremes of life requires greater manual dexterity and surgical judgment than surgery done during the active period of life. Prize ring tactics are never indicated in surgery, but time saved through familiarity with anatomy and recognized surgical procedures enables one to conduct the operation speedily.

The subject was suggested for presentation at this time because of personal experiences, and because of the happy circumstance that this Section is favored by having as its Chairman Dr. Finney, one of the world's greatest surgeons; one whose judgment and skill have made his name a symbol of good surgery. My own appreciation of him makes me reluctant to express opinions in his presence, and were it not for the fact that I know if my own experiences do not meet with his approval, that he will, without prejudice, bring to you the fruit of his long and varied experience in a manner that it will make it worthwhile for me to have paved the way for you and me to heed the words of counsel that he will give.

Knowledge and judgment are nowhere more necessary than when one faces a serious situation in the aged. Surgery may be just operating to some technicians, but operating upon the aged calls for a combination of technic and judgment.

These are neither new nor original observations, but they bear repetition. We often forget that what seems trite to one group is new to a younger generation. It is with this thought in mind that I want to discuss the subject of surgery in the aged.

Age is bound to be associated with organic changes which diminish the body reserve and resistance. Approach to surgical problems in the aged, especially the acute urgent ones, demands a rapid and as nearly accurate a survey of the reserve powers as possible so that sur-

*Read in Section on Surgery, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

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gical intervention will be attended by a minimum risk.

The anesthetic and the anesthetist must both be chosen with care and without regard for an ideal anesthetic. This statement may be pardoned, I hope, because there have been advocated in recent years so many ideal anesthetics that I have come to believe that this ideal exists, up to the present time, only in the mind of the most ardent advocate.

Due attention must be paid to buffering the circulation against fluid loss. The giving of fluids by whatever route is quickest will not only take care of the fluid balance, but will diminish the toxicity of the incomplete end products of body chemistry.

Dr. Matas and many others have within recent years insistently reminded us of the postoperative pneumopathies.

Slowing of the circulation, infection and loss of the elasticity of the vessel walls are conditions which favor thrombosis and embolism. We would do well to devote more attention to the recent work of Bancroft and Stanley Brown. More knowledge of the "clotting index" and the use of such measures as sodium thiosulphate in 10 per cent solution given intravenously will cut down the number of pulmonary and cerebral emboli, as well as postoperative thrombophlebitis.

The value of the "flat plate" in diagnosis in acute abdominal crises is not generally appreciated nor utilized sufficiently by those who do know. Its use does not cause loss of time, nor does it increase the hazard to the patient. In perforation of a hollow viscus the finding of pneumoperitoneum with the attendant elevation of the diaphragm, either over the liver or spleen, or both, is diagnostic. The elevation of the diaphragm and its fixation, as a fluoroscopic finding, are indicative of upper abdominal disease. The distended bowel and fluid levels cannot help but point to the obstructive nature of the lesion. It is true that the x-ray alone may not always lead to a correct diagnosis, yet the tremendous strides which have been made in it by workers like Westerborn of Sweden are impressive.

Hemoptysis requires careful differential diagnosis, particularly in view of the fact that gastric ulcer, as well as carcinoma, may be the responsible factors. There are many extra-gastric lesions such as gallbladder disease, pernicious anemia, splenic anemia and purpura hemorrhagica which must be considered possible etiologic factors to be eliminated when gastric hemorrhage occurs. Hasty surgery based on the one manifestation, gastric hemorrhage, leads to grief.

In the operating room lost motion, either from lack of preparation for contingencies or indecision, is inexcusable. Surgical consultations at the operating table are usually ill advised and time-consuming. They usually are harmful to the patient.

Adequate surgery which provides against possible complications should be done. Secondary procedures, made necessary by an oversight, often prove fatal. To be specific, I allude here to enterostomy which, if done at the primary operation, will often make convalescence smooth. Secondary operation, on a toxic patient, will be of little avail.

ADEQUATE SURGERY DIMINISHES THE NEED FOR AN EMPIRIC JUGGLING OF DRUGS

I shall in this brief paper try to present some problems which have confronted me; failures as well as successes will be discussed. From my failures I shall try to find whatever faults I can. Failures which have not taught something have not made the proper impression on us.

* * *

Perforating gastric ulcer, carcinoma of the stomach, intestinal obstruction due to intrinsic or extrinsic lesions, acute gangrenous cholecystitis, and cholelithiasis and appendicitis will form the bases for discussion.

In my own experience I recall cases of perforating gastric ulcer in the aged. Because of the commonly accepted idea of the rarity of this type of lesion in the aged, the clinical finding in one instance led us to disregard the x-ray findings, and to believe that the patient had carcinoma, since manifestations pointed that way. The radiologist insisted that we were dealing with a perforation and the operation proved the correctness of his diagnosis.

In the case of Mr. S. O. W., age 68 years (January, 1928), the provisional diagnosis was carcinoma of the stomach. The present attack began five weeks ago with abdominal pain. During this period he has lost many pounds. During the past twenty years he has experienced recurring colicky abdominal pains. There has been no history of vomiting nor other digestive disturbances.

He is markedly emaciated, the skin is dry, and has an icteric tinge. The abdomen is slightly distended, more on the left than on the right. The abdominal veins below the umbilicus are dilated. There is a well marked peristalsis on the left. At times a sausage-like mass is palpable on the left side of the abdomen. The abdominal wall is rigid above the umbilicus.

The red blood count is 3,550,000, white count 6,500, hemoglobin 65 per cent, neutrophils 68 per cent.

The radiologist reported on January 24, 1928, as follows: "This patient presents many findings of unusual interest. While the chest as a whole appears to be normal, the right diaphragm is elevated far above its normal level and a gas bubble is seen to be separating this from the dome of the liver. The administration of the barium meal shows a lesion at the pylorus upon the lesser curvature, approximately at the ring, presenting the characteristic deformity of ulcer with the remainder of the stomach apparently normal, with the exception of the fixation of the pyloric segment. At six hours there is almost a complete retention of the meal and again an irregularity at the pylorus can be observed. The evidence here is considered to be definitely that of a ruptured gastric ulcer."

The internist in charge made the following notes when transferring the patient to the Surgical Service: "January 31, 1928, turning him over to the Surgical Service, I wish to record my impression. The story indicates a gastric ulcer of long standing which has now become carcinomatous. I do not believe that he has had a perforation in spite of the gas observed above the liver on x-ray examination." (Signed) I. I. Lemann.

When I saw him I was impressed by the following facts: his age, rapid emaciation, and the gastric retention. Accordingly I wrote as my opinion: "It is true that the x-ray evidence does suggest a perforating gastric ulcer, but I believe that the clinical evidence points in another direction. Suggest exploration."

At operation I found a perforating gastric ulcer and a subphrenic abscess.

All abominal surgery directed against malignancy and suspected malignancy in the aged is urgent. Unfortunately, when the diagnosis is made it is often so late that palliation alone is feasible. This refers particularly to carcinoma of the stomach.

In personal experiences where optimism on the part of the radiologist indicated that an operable lesion was present, we have found metastases to the liver, fixation of the stomach to the pancreas, and extensive involvement of the omentum.

The following case illustrates the above statements:

W. B., age 53 years (February, 1929), came under the observation of competent men. The following is an abstract of his history: "Sour eructations, abdominal pain after eating, vomiting after meals. Loss of weight. Gastric analysis showed occult blood, and no free hydrochloric. Feces contained occult blood."

X-ray examination February 13, 1929: "X-ray of gastro-intestinal tract and chest, 81,663. The introduction of a barium meal into the stomach shows the fundus and median portion of the stomach to be normal. Occupying the pyloric segment and involving the anterior and posterior walls as well as the lesser and greater curvatures, there is a filling defect associated with a palpable mass and the barium passes through a very small channel at this location."

Conclusion of the radiologist: "Carcinoma of the pyloric segment of the stomach. This is an operable carcinoma from the viewpoint of the extent of stomach left, and should no metastatic processes be found in the abdomen at the time of operation, this should be a relatively easy case for resection."

Two weeks later I saw the patient in consultation. An exploratory operation revealed "a great mass occupying the right half of the stomach. The omentum was nodular, hard, of almost the firmness of cartilage. This same condition was noted on the lesser curvature. No further exploration was done, because the stomach was so thoroughly fixed and because the metastasis was so extensive and the great omentum was plastered over the transverse colon."

Surgery is usually futile except as a quickening process (aid in the rapidity of the inevitable fatal termination) if the palpable tumor mass involves the stomach.

One may ask, "Why is it that so few cases of carcinoma of the stomach are seen early enough to permit surgical removal?" It seems apparent that the formula which is accepted as diagnostic is evidence of the last stage of the disease.

Surgery to be valuable to these patients must be done in suspicious cases by surgeons competent to recognize gross pathology.

Even when no palpable mass exists operation is often too late. This is illustrated by the following case:

Mr. I. B., age 60 years, was admitted to Touro Infirmary August 25, 1922. The complaint was that the patient was afraid to eat because of a burning sensation immediately after eating and sour eructations. There was loss of weight.

Abdominal examination revealed the abdomen to be soft, with no areas of tenderness and no palpable masses. X-ray examination revealed a filling defect and a retention in the stomach of about four-fifths of the meal after 24 hours.

There was so much involvement of the stomach and the adjacent lymph nodes that I felt that a posterior gastro-enterostomy was the only thing that could be done, and this was proceeded with.

* * *

In the title the expression "urgent surgery" is used and not emergency surgery because there are cases which are urgent, but not necessarily emergent. On the other hand, emergency surgery in the aged is always urgent.

In the light of this explanation of the use of the word I feel that we can, without hesitation, include in this discussion cases of progressive

obstruction due to either an intrinsic or an extrinsic lesion.

Early diagnosis and operation is urgent in malignancy of the bowel. Late diagnosis and operation is useless except as a palliative measure.

The following case illustrates what I refer to as urgent, yet not emergency surgery:

Mr. L. L., age 50 years, was admitted to Touro Infirmary May 24, 1927, because he had a mass in the abdomen, a profound secondary anemia, marked loss of weight, and the x-ray findings indicated a filling defect in the transverse colon.

At operation a carcinoma of the transverse colon was found. There were no metastases, therefore it was feasible to do a resection and an end-to-end anastomosis at one operation. The patient gained 25 pounds in weight in a short period of time.

In this brief summary of the clinical story there are several points which merit comment, particularly the tumor mass and the anemia. Preoperative speculation as to the nature of a movable intra-abdominal mass is always interesting.

I have personally observed intra-abdominal masses where the lesion was in the omentum (Mr. C.); where the lesion was retroperitoneal (as in the case of J. P. and Mr. R., where I found retroperitoneal metastases secondary to teratoma of the testicle), and in another instance (Mr. L. L.) a filling defect reported radiologically as carcinoma of the cecum, proved to be an appendical abscess, causing the defect by extrinsic pressure.

In view of the above experience I believe that dogmatism with reference to the nature of a movable intra-abdominal mass prior to operation is evidence of lack of experience. This is again a plea for preparedness so far as the knowledge of various surgical procedures is concerned which may be necessary if time is to be saved in the handling of these cases. Since doubt may exist as to the nature of the tumor mass, avoidable delays in exploration are inexcusable.

Anemia in cases of carcinoma of the transverse colon is usually profound.

In 1913 and again in 1921, W. J. Mayo called attention to the fact that carcinoma of the proximal half of the colon has a greater tendency to the production of anemia than carcinoma of any other part of the body with a single exception of the median portion of the stomach.

Alvarez, in 1927, reviewed the experiences of the Mayo Clinic. He found anemia to be a striking manifestation in carcinoma of the cecum and ascending colon, and that the tendency to anemia is progressively less in the transverse and descending colon. The essential factor in the production of anemia, according to Alvarez, is a large ulcerative area from which blood can ooze. Alvarez emphasizes the necessity of investigating the cecum and large bowel when a patient presents a marked secondary anemia.

It is remarkable how these patients respond to transfusion followed by resection.

GALLBLADDER DISEASE

Gallbladder disease, either with or without stone, is a frequent urgent indication for surgery after the meridian of life and the results are none too good. Frequently unexpected deaths occur. Embolism, acute urinary suppression, "liver strike," or hepatic insufficiency are the immediate factors causing some of these deaths.

At autopsy we find in these cases many organs the function of which must have been altered if pathologic data is accepted. I mean that death in these cases cannot be attributed directly to any one organ, but to a vicious circle which made life impossible. The syndrome of many preagonal states is identical. Treatment directed at one to the exclusion of the others does not go far. Moreover, the personal equation in interpretation of observed phenomena differs widely. Until a time arrives when exact interpretation is possible, errors will result. To those who would doubt the above let him read the Balfour Lecture by Cushing on "The Etiology of Peptic Ulcer."

That the statement which I have just made "the syndrome of many preagonal states is identical" is correct is evidenced in a recent paper by Charles Gordon Heyd on "liver deaths" in surgery of the gallbladder.

Heyd mentions a recent contribution by Stanton in which 500 fatal cases were analyzed in a combined series of approximately 10,000 gallbladder operations. Thirty-eight individual causes were designated as the lethal factor. The causes of death given in the order of their frequency were peritonitis, pneumonia, embolism, cardiac failure, spontaneous perforation, sepsis and renal failure.

Heyd analyzed the mortality statistics of the New York Postgraduate Hospital and he was impressed with a small group of fatal cases,

"in which the cause of death could in no way be placed under such obvious types of mortality. [As given by Stanton] There was about this group of cases an unexplained chemical mechanism as the outstanding feature in the production of death, which was directly sequential to operative intervention. . . . .

"We were able to distinguish with variations three distinctive types of deaths following gallbladder surgery

and for want of a better term we have designated them as 'liver deaths,' apparently due to a change in the physiologic status of the liver-gallbladder unit."

The three types which he designated as "liver deaths" are depicted in the first place (*Type I*) by a patient not arousing from the anesthetic, progressive coma and gradual ascent of temperature, pulse and respiration. This patient died at the end of approximately 36 hours. (*Type II.*) "For the first few days after the operation the postoperative course is normal and satisfactory, the biliary discharge becomes less and less in amount and more watery in consistency. The patient becomes delirious, there is marked cerebral excitation and finally stupor and coma. There is no clinical evidence of intra-abdominal hemorrhage or infection."

He asks the questions: "What has been the effect of the sudden decompensation?" And "Do the liver cells function for a short time postoperatively and then fail?"

In the third type, for 24 to 36 hours after operation there is apparently a normal postoperative course, then the pulse rate becomes markedly accelerated. The patient becomes prostrated with a fall in the blood pressure and a cessation of urinary secretion, and exhibits cold, clammy, moist extremities. The abdomen shows no clinical evidence of an unusual postoperative condition. A negative gastric lavage demonstrates no gastric dilatation. "That all who have had the experience of standing at the bed of a patient on whom one has operated that morning asks himself: 'What is the mechanism that is killing that patient?' A few hours later the patient is dead. The death certificate is made out: terminal pneumonia, heart failure or uremia, three insecure diagnoses, terminal events. Some chemical change has taken place, whether it has been the unfortunate misadventure of the time of operation or something else, the result has been sequential to the operation intervention."

Dr. Damon B. Pfeiffer, discussing Heyd's paper, stated: "It seems probable that the outcome is due to some derangement, not thoroughly understood, of certain essential hepatic functions. It is well to appreciate the dangers that lurk in operations on patients with a damaged liver."

Donald Guthrie, in a recent review of 434 gallbladder and duct operations, analyzed several so-called deaths from hepatic failure. The characteristics in some of these cases seem to be a sudden drop in blood pressure, rapid, shallow respiration, cold, clammy skin, collapse and cyanosis, hyperpyrexia, death.

The experience of those who have been quoted seems to strengthen my opinion, that death in these cases cannot be attributed directly to any one organ. It is a vicious circle produced by the association of degenerative changes in many organs which produce toxins which make continuance of life impossible.

Let us recall for the moment that practically all gallbladder disease is associated with infection, and that there is liver damage in a great proportion of the cases. Liver function tests are not yet sufficiently accurate to be of great benefit.

Until recently the "liver deaths" following gallbladder surgery have been a source of mystery. With the unfolding of knowledge with reference to the effects of (1) sudden change in the hydrostatics of biliary circulation precipitated by the removal of the gallbladder; (2) the effect of increased icterus index on secondary hemorrhage, whether concealed or not; (3) and the effect of the increased icterus index on the clotting index and on the kidneys, we shall learn more and more to appreciate the value of earlier intervention so that the calamities of the past may cease to be the source of high mortality rates in this type of case.

There are other factors which are not so prominently considered in some of our discussions.

Surgery is at times attempted in these cases without information which can easily be obtained. Surgery of the gallbladder is not always a work of art. We all know that many surgeons are satisfied that they are skillful enough to identify the cystic duct. After they have done this, the gallbladder is removed with little regard for what may be present in the ducts beyond. Only recently Frank Lahey has proven that by routine investigation of the common duct many stones are brought to light which might otherwise have remained to give trouble at a later date. This impressive finding of Lahey's should bear fruit. Ill advised surgery, such as cholecystectomy, when a gangrenous process exists, may and does cause, unnecessary loss of life.

In discussing urgent abdominal surgery directed against the gallbladder I want briefly to discuss a particular experience which gave me a tremendous amount of joy.

On February 5, 1932, I was called to see Mrs. F. W., who was approximately 82 years of age. She was complaining of a constant abdominal pain which had lasted 12 hours. Believing the pain to be due to a dietary indiscretion, she had taken milk of magnesia, which she promptly vomited. The pain was limited to the right side of the abdomen. Her temperature was normal. The pulse varied between 80 and 90. There was marked resistance of the abdominal muscles on the right side. The leucocyte count taken immediately was 19,200, with 88 per cent neutrophils.

Within two hours I saw the patient again and advised immediate removal to the hospital, as it seemed to me she had an acute surgical abdomen, localization pointing more directly at that time to an appendix.

On account of her age and the responsibility involved I advised that a consultation be called. Accordingly Dr. C. Jeff Miller was asked to see the patient after her admission to Touro Infirmary. A blood count taken at this time was 28,000, with 84 per cent neutrophils.

At this time her pain was more hypogastric and hypochondriac than right iliac. There was more pain

on palpation in the hypochondrium than in the right iliac region, thus pointing to a possible gallbladder in association with an appendix. Dr. Miller concurred in the opinion, but seemed to lean more to the probability of a gallbladder as the immediate causative factor.

Operation was proceeded with. A right rectus muscle splitting incision was done and the peritoneum opened. A large quantity of free peritoneal fluid was found and some fibrinous exudate on the bowel. The cecum was brought into view; the appendix was short, thickened, pale; the meso contained a large quantity of fat which was friable.

Appendectomy in the usual manner was done, with ligature of the meso, clamp, ligature, pursestring, carbolized knife, alcohol and inversion.

A hand was inserted into the upper quadrant and it was found that the gallbladder was stuffed and tense. The incision was prolonged upward and the gallbladder exposed, protruding under the edge of the liver. The liver was yellowish brown in appearance and seemed to be very friable.

The gallbladder was aspirated and incised and about 100 gallstones, variable in size, were removed. A pezzer catheter was introduced into the gallbladder and the wall of the gallbladder approximated around the pezzer catheter.

Cecostomy was done after this.

The abdomen was closed, using interrupted through and through sutures, as well as tier sutures, peritoneum with plain catgut; sheath of rectus with chromic catgut, skin with an interlock of dermol sutures.

What difference in procedure did age make? At the operating table particularly it caused me to do an enterostomy in addition to what had already been done. There may be those who would not have considered enterostomy a necessity. Believing, as I do, that absorption from either a closed loop or stagnant loops of gut is a potent source of trouble in peritonitis, I performed an enterostomy.

There is no question in my mind that the two most valuable things done for this patient were, first, enterostomy, and second, supplying fluid in large quantities by vein.

Convalescence was not marked by anything unusual until suddenly on the afternoon of the sixth postoperative day she complained of pain in her chest, dyspnea, and a non-productive cough. In a short while she became cyanosed. It was my impression that a bronchus was blocked, and accordingly carbon dioxide was given. In a short time she was relieved of pain and her color soon became pink.

It is the routine with me to give carbon dioxide postoperatively, at least twice during the first 24 hours. I believe that by so doing many pulmonary complications can be prevented.

This patient went on to ultimate recovery and is now, several months later, apparently in excellent shape. Every such experience brings us nearer that goal to which Dr. Finney alluded in his address, "Saving the Hundredth Man."

There is the other side of the picture. Discouragement usually follows a sudden unexpected death. If we were better able to interpret a patient's symptoms and knew more of the complex body chemistry, we should see fewer sudden deaths and fewer alibis would be seen on death certificates. Such unexpected experiences should stimulate rather than depress after the primary shock is over. This is well illustrated in the life of the late Dr. Willy Meyer. In a recent biographic tribute to Dr. Meyer, the author mentions the fact that in 1895 his eldest daughter, then nine years old, developed an acute appendicitis. The child was operated upon and died. Dr. Meyer's reaction to this great tragedy might well be taken as a model of action, for the author states:

"Stunned and crushed by this irreparable loss, he began an intensive study of the subject and wrote many papers. He stamped appendicitis a surgical disease, and urgently advised immediate operation during or immediately after the first attack."

In a recent paper by Harvey Cushing, attention is called to the fact that incomplete autopsies probably are responsible for lack of information as to the real cause of death. In many abdominal cases, the brain is not examined and in deaths caused by disease of the brain, abdominal examinations are often omitted. After examining a number of records in which the cause of death has been put down as "cardiac failure" I am more convinced that without autopsy, certificates do not give sufficient information. Many of the so-called cardiac failures without evidence of cardiac decompensation are in reality due to other causes. Death is attributed to myocarditis when the cardiac or respiratory failure was probably secondary to compression phenomena.

I believe in the case, the summary of which follows, that death was directly due to compression phenomena. Unfortunately, the only evidence we have is blood obtained by cisterna puncture.

In the case of Mrs. S. G., age 72 years (I-6759) the provisional diagnosis was empyema of the gallbladder, cholelithiasis and obstruction of the common bile duct by stone. The final diagnosis was empyema of the gallbladder, cholelithiasis, obstruction of the common duct, circulatory collapse, acute parenchymatous nephritis, and cerebral embolus. October 8, 1931, three days prior to admission, she complained of severe abdominal pain which became progressively worse until the day of admission to the hospital, at which time her temperature was 103° and pulse 96. The patient

was deeply jaundiced, the abdomen was distended, rigid and tender to the touch.

Immediately laboratory data were obtained. Urine examination revealed a specific gravity of 1.030, a heavy trace of albumin, and bile four plus. The blood count revealed leucocytes 21,500, neutrophils 76 per cent, large mononuclears 12, the van den Bergh rapid direct positive, icterus index 50. Blood pressure was 138/76; coagulating time 4 minutes, and bleeding time 2½ minutes.

An immediate operation was done, with removal of stones and cholecystostomy.

During the first 24 hours after operation we obtained 250 c. c. of urine by catheter. Respiration varied between 26 and 32. The pulse remained around 100-112, with no abnormal distention. On the afternoon of the second day (about 48 hours after operation) the patient seemed to be in no immediate danger. The only untoward outward manifestation was the small urinary output. Less than 45 minutes after my visit to her bedside the intern was summoned because her pulse became suddenly imperceptible. The blood pressure was so low when the intern arrived that he could not make a reading. She did not complain of pain; no cyanosis was noted. Respiration failed before the heart.

At autopsy we found evidence of acute parenchymatous nephritis, hepatitis, fatty degeneration of the liver and by cisterna puncture we obtained bloody cerebrospinal fluid.

As we look back over this case we question what could have been done to avert the tragedy. Surgery was urgently indicated when I saw her. Further delay would certainly have been fatal. The chance had to be taken. The particular terminal phenomena I could not foresee. Perhaps another might have been a better prophet, and maybe now someone might tell me how I can avoid such an experience again. Suggestions are welcome. The only suggestion that seems pertinent is that surgery was deferred years too long, as we read in her history that she had had "indigestion" for a number of years.

In another gallbladder death the danger of delay and the need for surgery in jaundiced patients is emphasized. Definite diagnosis is not always possible. Cases which from available clinical and laboratory data seem to have a malignant process are found at operation to have a stone, which gives a better chance for cure.

As one reads such a history as the following he wonders how it is possible that men who pose as physicians can either procrastinate so long or accept responsibility for treatment of conditions which another might have handled better. After all it is life we are dealing with.

In the case of Mrs. A. G., age 56 years (J-1480), the provisional diagnosis was diabetes mellitis and carcinoma of the head of the pancreas. The final diagnosis was cholelithiasis, chronic interstitial nephritis, and acute nephritis. In March, 1932, the patient, a known diabetic, had complained of progressive weakness and a painless jaundice. There had been a marked loss of weight. The manifestations noted above had lasted about six weeks. During that period she had been under the observation of a licensed practitioner. Her jaundice became very deep; her weakness marked.

The patient then consulted Dr. I. I. Lemann who, after making a complete examination, referred the patient to me for surgical intervention.

The outstanding findings of the clinical examination were as follows: jaundice; telangiectases on the chest; the abdomen was large; the liver could be felt about three fingers' breadth below the costal margin. There was a palpable mass which was movable, not particularly tender to the touch, in the right hypochondrium. This, we believe to be the gallbladder.

Blood count showed 5,170,000 red cells, 8,000 leucocytes, neutrophils 75 per cent, platelets 640,000, coagulating time 3 minutes, bleeding time 2 minutes, 30 seconds. Blood chemistry: total non-protein nitrogen, 30; urea nitrogen, 15; creatinine, 1.3; uric acid, 2.5; dextrose, 172. The icterus index was 105. Examination of the urine showed large quantities of bile. Qualitatively there was a reducing action indicative of the presence of sugar. The van den Bergh showed a rapid biphasic reaction.

A summary of the case then shows painless jaundice, loss of weight, diarrhea, coloring matter in the stools, bile in the urine and glycosuria.

Our findings seemed to indicate that we were probably dealing with an obstructive jaundice due to malignancy. However, the presence of stones in the gallbladder, causing a mechanical obstruction, was mentioned as a possibility before operation. The following is an abstract of the operative record:

"Preoperative diagnosis: (1) obstructive jaundice due to malignancy; (2) cholelithiasis, mechanical obstruction, stones in the gallbladder by mechanical pressure producing an obstruction.

"Operative procedure: right rectus incision. Peritoneum deeply jaundiced, thickened. As soon as the abdomen was opened a gallbladder with thickened walls, not translucent, distended with stones, was felt and seen. The liver had an irregular blue-gray slate color, mottled with some definite changes of chronic hepatitis. It was not the liver of a cholangitis.

"There were adhesions between the omentum and the entire gallbladder with the exception of the fundus. These adhesions were separated, so that I could determine as nearly as possible the condition of the common duct and the pancreas and also thinking that I might have to close the common duct, should the obstruction be in there.

"The gallbladder was incised and about 200 faceted stones were found in the gallbladder and in the duct. Four or five of these stones had slipped down into the common and some we found in the hepatic duct. These were milked down and brought out through the gallbladder opening.

"After this the gallbladder was observed and palpated from within. The ducts were palpated; no further stones were found. The head of the pancreas seemed to be enlarged and rather hard.

"A pezzer catheter was placed in the fundus of the gallbladder and pursestringed-Lembert sutures. The abdomen was closed by the tier method.

"Postoperative course: during the first 24 hours postoperatively the patient did not void and no urine was obtained by catheter. During the second 24 hours 90 c. c. of urine were obtained. The patient was restless. The abdomen was only slightly distended, and while she regurgitated small quantities of brown fluid, the stomach was not found to be dilated when a nasal tube was passed. Her temperature rose to 101.6 on the first postoperative day and remained near that level until the end.

"Restlessness was progressive, air hunger became a prominent feature as the pulse became weaker and respiration more shallow."

This case conforms to Type 3 of Heyd's classification of "liver deaths." I cannot believe that the liver alone was responsible. This is just another example which emphasizes that these unexpected deaths cannot be attributed directly to any one organ. The experiences related in this paper remind us as surgeons that we must reverse the sentiment of Tennyson's "Charge of the Light Brigade:" "Theirs not to reason why, theirs but to do and die;" for it is our duty to make an effort to reason why, so that eventually fewer such experiences will confront our successors.

CONCLUSIONS

(1) Urgent surgery in the aged demands a careful survey of reserve powers so that surgery will be attended by a minimum risk.

(2) Immediate careful prophylactic preoperative preparation is essential.

(3) Prompt, adequate and expeditious surgery should be done.

(4) The anesthetic should be selected with care.

(5) Consultations should be avoided at the operating table.

(6) Postoperative treatment should be planned to prevent tragic complications.

(7) An adequate supply of fluids will prevent dehydration.

(8) The routine use of carbon dioxide will minimize postoperative pulmonary complications.

(9) Suspicion will prevent many unnecessary deaths from malignancy of the stomach and bowel.

(10) Enterostomy will prevent deaths from ileus in cases of acute surgical abdomens in the aged.

(11) Gallbladder disease is a frequent indication for urgent surgery after the meridian of life.

(12) Attention is directed to the so-called "liver deaths."

(13) The unexplained postoperative deaths are most often due to a vicious circle produced by degenerative changes in many organs rather than directly attributable to failure of function in one organ.

(14) Incomplete autopsy or failure to do an autopsy are responsible for incorrect death certificates.

(15) A review of our failures and a careful study of disturbances of blood chemistry will diminish the mortality statistics in the aged.

(16) Contentment with one's end results will do nothing towards stimulating our successors.

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DISCUSSION (*Abstract*)

Dr. Frank K. Boland, Atlanta, Ga.—In the preoperative preparation of an elderly patient we should remember that older persons as a rule are more susceptible to the effects of opium than younger people. One-fourth of a grain of morphia administered to an old man or woman not used to it is liable to lower the respiration to ten or twelve a minute and cause the anesthetist no little worry. Such a dose may diminish the cough reflex after the operation, and thus invite pulmonary complications. I believe in the use of 10 per cent carbon dioxide with 90 per cent oxygen daily for two or three days following the operation as a means of increasing the force of respiration, and thus blowing mucus out of the bronchi and preventing pulmonary collapse.

I have never found a roentgenogram without barium of much value in locating the point of an acute intestinal obstruction, but it is useful in recognizing the presence of free gas in the peritoneal cavity. Sometimes a lateral view is necessary to tell whether gas or air is above or below the diaphragm. Patients with biliary disease should be given plenty of fluids and glucose before operation. This may keep down the number of "liver deaths." One of the most vital points stressed by Dr. Cohn is that surgery of the biliary tract in the aged should be done early, before complications, such as stone in the common duct, have had time to develop. Stone in the common duct should be suspected and sought in all patients with biliary disease, but especially in elderly subjects. While it is recognized that cholecystectomy generally is to be preferred to cholecystostomy, often it is better judgment in old people to drain the gallbladder than to take it out. These patients require special postoperative care. Apparently trivial things need attention. Patients should be protected from draughts in bringing them from the operating room to their beds. Their position in bed should be changed frequently, and the urinary output should be maintained. And then, finally, after great apprehension on the part of doctors and friends, how often do our 70-year-old patients withstand a serious abdom-

inal operation perfectly and make a rapid and complete recovery!

Dr. J. M. Mason, Birmingham, Ala.—Aged patients are, as a rule, poor surgical risks. Too often they have lived on quietly and with but little tax on their vital resources until some illness or accident makes demands upon them which they are unable to meet.

I have been particularly impressed with the gravity of gallbladder and appendical disease in the aged. The attack which brings an aged person to operation is usually a severe one, and is generally one of a series, each one of which has aggravated the local condition and has, in addition, contributed its part to undermining the resistance and strength of the patient.

General anesthesia and prolonged confinement to bed after operations are further unfavorable features. Hence local anesthesia should be employed whenever possible.

I have had no experience with enterostomy in the class of cases in which Dr. Cohn recommends it, but agree with him as to its value.

THE END-RESULTS OF TEN YEARS' STUDY OF TREATMENT OF PREGNANCY SYPHILIS IN TRIMESTERS*

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and
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The high incidence of stillbirths from syphilis in the Maternity Clinic of the Memphis General Hospital prior to 1922 prompted a joint conference of the departmental heads of the Clinics of Obstetrics, Pediatrics and Syphilology. It was evident that unless united effort was made little could be accomplished in progress toward lowering our unfortunate record.

The Department of Obstetrics obligated itself to refer all cases presenting evidence of syphilis, serologically or clinically, to the Department of Syphilology for immediate consultation and treatment; to insure return of patients at regular intervals; to examine babies immediately after birth; and to refer babies from the postpartum clinic to the syphilis clinic whether or not there were evidences of syphilis.

The Department of Syphilology likewise assumed its obligation by reserving one week day for the study and treatment of syphilitic pregnant women, special attention being directed toward the dosage, interval and specific follow-up of all invalided cases in the hospital.

The Department of Pediatrics, for its part, requested active control of babies referred to it presenting no evidence of syphilis. This measure was to ascertain the exact number of patients who might become serologically or clinically positive and for the purpose of directing treatment where evidences of the disease were found.

Of such interest was this problem that one of us personally extracted the history and follow-up records of the first 500 cases included in this report. Later they were given the Department of Syphilology with the request that an analytical study be made.

The material which forms the basis of this study is from consecutive patients admitted to the Clinic from June, 1922, to June, 1932. Our reason for submitting an even number of patients in this ten years' study was one of convenience in estimating the end-results on an actual percentage basis.

On admission to the Maternity Clinic the patient was given a thorough physical examination. Evidence of syphilis was sought. Superficial lesions of the genitals were formerly studied by dark field examinations. This method, however, proved unsatisfactory and burdensome in that the majority of the examinations of suspicious lesions resulted in negative evidence. It is not denied that a positive finding is conclusive. The history of infection, various syphilitic manifestations and stillbirths are considered in correlating a diagnosis. In our Clinic the serological reaction, the Wassermann checked by the Kahn, is depended upon to give positive or negative indication of the existence of syphilis.

We do not feel that pregnancy alters in any way the serological reaction. We checked the 500 positive Wassermann reactions and found them to be about 100 per cent accurate. Later the Kahn was run in conjunction with every Wassermann. To verify the accuracy of the reaction a second Wassermann and Kahn were made upon every patient showing either reaction positive. We therefore feel that any patient whose blood shows a positive Wassermann and Kahn, even without clinical evidence of syphilis, is syphilitic and should be given immediate treatment. Less than one week elapses between diagnosis and initiation of treatment.

In those instances of patients who fail to attend the Clinic and in whom serological studies cannot be made; whose histories and serological or clinical signs are negative, placental studies

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*Read in Section on Obstetrics, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

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†Died January 3, 1933.

are indicated and would prove invaluable. We are thoroughly in accord with others that the placenta yields an abundance of information in establishing or correlating the diagnosis of congenital syphilis. Unfortunately study of this interesting phase is prohibitive because of our meager endowment.

Our Department lends additional assistance to the careful follow-up of the Department of Syphilology. The latter has a supervisor with two trained assistants to conduct the clerical work. Our Department is constantly on the alert for those patients who fail to continue treatment. The maternity supervising nurse shares in the responsibility for the return of these patients. As a further aid, all visiting district and city nurses ferret out the negligents.

Our State law does not require those afflicted with syphilis to receive treatment, but our Clinic refuses to care for patients who decline this service. Our insistence has been so great that within the past ten years we have had but six patients who refused. This is evidenced by the fact that but 7 per cent of the 1,000 cases failed to receive treatment, that over 50 per cent began treatment in the first trimester and 27 per cent in the second trimester. It is with pleasurable pride that we point to the fact that over 77 per cent of our patients received treatment during the first six months.

The treatment is under the direct supervision of the Department of Syphilology, and the Department of Obstetrics does not attempt to outline the procedure. Occasionally, however, in cases where serological and clinical evidence fail to suggest the cause of repeated stillbirths, we request that antisyphilitic treatment be given a trial. Hope is indulged that a special clinic for syphilitic patients may soon be inaugurated on our service, thereby relieving the obstetrician of this obligation during his routine antenatal studies. Moreover, if patients require antenatal hospitalization for any reason, the Department of Syphilology is responsible for the continuance of treatment.

In the immediate puerperium, babies of mothers treated in the antenatal period are studied. If clinical and serological evidence of syphilis is present treatment is begun at once. We feel that much valuable time may be lost between delivery and the usual six weeks follow-up visit. Cord Wassermanns are not relied upon, as the positive ones only are indicative of syphilis.

At the six weeks postpartum clinic all mothers and babies are referred to the syphilis clinic for study. The baby is referred to a special division of the Pediatrics Service known to us as the "congenital syphilis clinic." Those babies presenting clinical and serological evidence are treated, while those pronounced normal are placed under observation for two years. Regular blood Wessermanns, however, are made at three month intervals. No child is treated upon the basis of the mother's condition.

Chart 1

Number of patients admitted to clinic June, 1922, to June, 1932	10,000
Number of patients included in this study	1,000
Primipara	48 per cent
Multipara	52 per cent
Treatment begun in first trimester	50 per cent
Treatment begun in second trimester	27 per cent
Treatment begun in third trimester	17 per cent
Total number of patients receiving treatment	94 per cent
Total number of patients receiving no treatment	6 per cent

Analysis of our series of 1,000 cases of pregnancy syphilis extended over a period of ten years. Approximately 10,000 new admissions showed an incidence of syphilis in 10 per cent of the cases. This is in accord with most clinics having a large colored clientele. Furthermore, it is interesting to note that it is comparatively easy to educate the young negress, as well as the older ones, to the importance of treatment, the ratio in the series being 48 and 52 per cent, respectively. This is further emphasized in that (*Chart 1*) 94 per cent received treatment with only 6 per cent failures. This failure of 6 per cent may be accounted for largely because of the occasional late admission to the Clinic and the inconvenience incident to the later months of pregnancy, making it impossible for many to attend. We have no auxiliary outpost for these patients. In the immediate future we contemplate such a station for their accommodation.

Chart 2

For convenience this study is divided into groups.

Group I. Previous pregnancies terminating in abortion or stillbirth.

Group II. Previous pregnancies terminating in living syphilitic babies, many dying within eighteen months.

Group III. First pregnancy.

Chart 2 in the series is divided for convenience into groups. *Group I* consists of those patients who have never given birth to a living baby and composes 31 per cent of all cases. *Group II*, in which pregnancy has proceeded to term and resulted in living syphilitic children, many of whom succumbed before 18 months, composes 21 per cent of all cases. *Group III* represents women registered for their first pregnancy, composing 48 per cent of all cases. It

may be observed that *Group III* contains the largest number, and we trust the future will shift most of the patients into this group, thereby salvaging the tremendous number of obstetric tragedies previously sacrificed in the first two groups.

The groups were further divided into trimester study. It is believed that the earlier in pregnancy treatment is begun the greater opportunity of obtaining syphilis-free offspring. A study of this nature may be of prognostic value in evaluating the incidence of normal living babies; in determining whether the serological or clinical evidence appeared primarily; in ascertaining whether serological was substantiated by clinical evidence at birth or later, or vice versa; and, lastly, in acquiring definite information relative to the true story of abortion, premature labor and stillbirth.

Chart 3

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Group Trimester Study in Percentage Resulting in Normal Babies

	Per Cent
Group I	31
Full term, treatment begun in first trimester.	
Full term, treatment begun in second trimester.	
Full term, treatment begun in third trimester.	
Normal, 20 per cent; failures, 11 per cent.	
Group II	21
Full term, treatment begun in first trimester.	
Full term, treatment begun in second trimester.	
Full term, treatment begun in third trimester.	
Normal, 15 per cent; failures, 6 per cent.	
Group III	48
Full term, treatment begun in first trimester.	
Full term, treatment begun in second trimester.	
Full term, treatment begun in third trimester.	
Normal, 30 per cent; failures, 18 per cent.	

The combined end-results in normal living babies are studied in *Chart 3*. It is observed that when treatment was begun in the first trimester more normal living babies were delivered than in the others. *Group III* gives a larger percentage of living babies than the other groups, but striking is the 50 per cent increase in living babies of *Group I* over *Group II*. The reason for this is inexplainable, as the age of the syphilis was not studied. This may be a factor, but it is strange that in *Group I* women who had never given birth to a living baby should show better results than those whose physical syphilis permitted pregnancy to proceed to full term, with living syphilitic children. It is further interesting to note that the third trimester promised about 7 per cent for a living baby in *Group II* and 12 per cent chance in *Group III*. The end-result was 65 per cent normal children for all groups, with 35 per cent failure in syphilitic tragedies.

Chart 4

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Group Trimester Study in Percentage, Resulting in Syphilitic Babies with Serological Evidence Only

	Per Cent
Group I	4
First trimester, full term, 2 to 4 plus Wassermann	4
Second trimester, full term, 2 to 4 plus Wassermann	0
Third trimester, full term, 2 to 4 plus Wassermann	0
Group II	2.5
First trimester, full term, 2 to 4 plus Wassermann	0
Second trimester, full term, 2 to 4 plus Wassermann	2
Third trimester, full term, 2 to 4 plus Wassermann	5
Group III	5
First trimester, full term, 2 to 4 plus Wassermann	2
Second trimester, full term, 2 to 4 plus Wassermann	1
Third trimester, full term, 2 to 4 plus Wassermann	1

Chart 5

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Group Total Trimester Study Contrasting the Incidence of Syphilis Tragedies

	Normal Babies Per Cent	Serological Evidence Per Cent
Group I	20	4
Group II	15	2.5
Group III	30	5
Total	65	11.5

The next point of interest is the study of *Chart 4*, in which normal living babies have been eliminated. This reveals the presence of serological evidence only and consists of 11.5 per cent of the 35 per cent syphilitic tragedies. The figures in this group are apparently inconsistent. In *Group I*, first trimester, 4 per cent presented evidence, while in *Group II* there was no evidence and in *Group III* the serological evidence presented was 2 per cent. The second and third trimesters of *Group I* disclosed no further serological evidence.

In *Groups II* and *III* the second and third trimesters showed 2 per cent and 0.5 per cent, respectively, while in *Group III* the second and third trimesters showed proportionate evidence. If this serological study is to be of value it must be contrasted with the same group trimester study of clinical evidence of syphilis.

Chart 6

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Group Trimester Study in Percentage, Resulting in Babies with Clinical Evidence of Syphilis

	Per Cent
Group I	4
First trimester, full term	0
Second trimester, full term	3
Third trimester, full term	1
Group II	0.5
First trimester, full term	0
Second trimester, full term	0
Third trimester, full term	0.5
Group III	5.5
First trimester, full term	1
Second trimester, full term, premature	1
Third trimester, full term, premature	3.5

Chart 7

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Group Total Trimester Study Contrasting the Further Incidence of Syphilis Tragedies

	Normal Babies Per Cent	Serological Evidence Per Cent	Clinical Evidence Per Cent
Group I	20	4	4
Group II	15	2.5	0.5
Group III	30	5	5.5
Total	65	11.5	10

Chart 6 composes 10 per cent of the 35 per cent syphilitic tragedies showing clinical evidence. In *Group I*, first trimester, no clinical evidence is seen, while in the second and third trimesters syphilis is apparent in 3 per cent and 1 per cent, respectively. In *Group* II only 0.5 per cent clinical evidence is observed, showing the fallacy of depending solely upon this evidence for diagnosis, while in *Group III* younger women's babies gave more evidence of syphilis than in the first trimester with 1 per cent. The second trimester contained 1 per cent, with an increase to 3.5 per cent in the third trimester. It has always been felt that serological was more frequently present than clinical evidence, but by contrasting the group collectively with serological against clinical evidence there is only 11.5 against 10 per cent. A study of these groups, therefore, disproves previous opinion and indicates that either may show itself in any trimester. The percentage of these babies presenting clinical evidence of syphilis with positive blood reaction, and vice versa, would be interesting. Unfortunately, this calculation was not made.

Chart 8

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Group Trimester Study in Percentage, Resulting in Stillbirths

	Per Cent
Group I	3
First trimester, full term	0
Second trimester, full term, premature	2
Third trimester, full term, premature	1
Group II	0
First trimester, full term, premature	0
Second trimester, full term, premature	0
Third trimester, full term, premature	0
Group III	4.5
First trimester, full term, premature	1
Second trimester, full term, premature	1
Third trimester, full term, premature	2.5

Chart 8 gives the syphilitic tragedies regardless of treatment, accounting for the remaining 7.5 per cent of the total 35 per cent. *Groups I* and *II* show that no stillbirths resulted when treatment was begun in the first trimester, while *Group III* gives 1 per cent stillbirths. In the second trimester of *Group I*, 2 per cent occurred, while there were none in the second of *Group II*.

Chart 9

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Group Total Trimester Study Contrasting the Incidence of all Syphilis Tragedies

	Normal Babies Per Cent	Serological Evidence Per Cent	Clinical Evidence Per Cent	Abortion, Premature Full Term Stillbirths Per Cent
Group I	20	4	4	3
Group II	15	2.5	0.5	0
Group III	30	5	5.5	4.5
Total	65	11.5	10	7.5

Grand Total, End-Results

Treated cases normal, 65 per cent; failures, 29 per cent—94 per cent.

Untreated cases in series, 6 per cent.

In *Group III*, second trimester, there was 1 per cent. In the third trimester 1 per cent occurred in *Group I*, none in *Group II*, and a decided increase in *Group III*. It is singular that the largest number occurred in *Group III*, while the absence in *Group II* suggests either the building up of immunity or the presence of organisms of less virulence, which is not consistent with the normal baby ratio where the best results were obtained in *Group I* and *Group III*. If it were possible to obtain less premature and full term stillbirths in *Group II* it would seem likely that more normal babies would have been born in this group. This is not the case.

Chart 10

END-RESULTS OF 1,000 SYPHILIS PREGNANCIES

Comparative Trimester Study in Percentage Receiving No Treatment

	Per Cent
Group I	0
All trimesters, receiving no treatment.	
Group II	4
All trimesters, receiving no treatment.	
Full term, 2 to 4 plus Wassermann	2
Full term, stillborn	1
Miscarriage	0.4
Abortions	0.6
Group 3	2
All trimesters, receiving no treatment.	
Full term, clinical evidence	1
Stillbirths	1
Abortions	0

Chart 10 reviews the end-results in patients receiving no treatment for various reasons. This group consists of 6 per cent of the 1,000 patients included in this study. The fact that approximately 90 per cent of our patients were negroes is evidence that there was thorough cooperation. Even though there is no compulsory law requiring this treatment, the desire for it speaks well for the hoped-for eradication of congenital syphilis. Much credit is sponsored by our good follow-up system and the general betterment of physical feeling; but to the clinical supervisor of the Syphilology Clinic, Miss Annie LaRoche, who, by her untiring efforts and sym-

pathetic attitude over a long period of years has endeared herself to everyone, we make this acknowledgment of sincere gratitude.

Chart 7 emphasizes that no patient in *Group I* in any trimester failed to receive treatment. This is accounted for in the belief that the desire for future children was paramount in these women who had suffered repeated abortions and stillbirths, varying from two to ten each. Four of the 6 per cent total of all cases are found in *Group II*. Two per cent of these resulted in serologically positive babies, while 2 per cent resulted in abortion and miscarriage. In *Group III* the remaining 2 per cent occurred, 1 per cent resulting in babies with clinical evidence and 1 per cent in abortions and stillbirths. The outstanding finding in this group of untreated mothers is that no living normal babies were delivered. This is contrary to similar studies by others regarding normal living babies born to untreated mothers. In our series, a contrast study of untreated mothers is too small to justify comparison with the treated group, as error in this respect may have crept into our tabulation. Where 50 per cent of all untreated mothers resulted in abortions, premature and full term stillbirths and the remaining 50 per cent had clinical and serological evidence only a very slight discrepancy is possible. This is further emphasized in *Chart 8* of patients having had intensive treatment in previous pregnancies with no resumption of treatment in the current pregnancy, resulting in 4 per cent only in normal living babies. Therefore, the statement made previously, that no untreated mother gave birth to a normal living baby, is, in a measure, substantiated.

Chart 11

ANALYSIS OF 150 PATIENTS HAVING HAD TREATMENT DURING PREVIOUS PREGNANCIES. INTENSIVE TREATMENT RESUMED IN CURRENT PREGNANCY EVEN THOUGH WASSERMANN REACTION WAS NEGATIVE

	Per Cent
Group I. Treatment started in first trimester	40
Results:	
Full term normal	38
Full term 2 plus Wassermann	2
Group II. Treatment started in second trimester	28
Results:	
Full term normal	24
Full term 2 plus Wassermann only	2
Full term 4 plus Wassermann only	2
Group III. Treatment started in third trimester	2
Results:	
Full term normal	10
Full term 2 plus Wassermann only	6
Full term 4 plus Wassermann only	2
Full term, clinical evidence	2
Group IV. Receiving no treatment in current pregnancy	12
Results:	
Full term normal	4
Full term 4 plus Wassermann	4
Full term stillbirths	2
Premature, abortions	2

Chart 12

SUMMARY OF ANALYSIS OF 1,000 CASES PRESENTING EVIDENCE OF SYPHILIS PREGNANCIES

	Per Cent
Receiving treatment	94
Receiving no treatment	6
Of those receiving treatment:	
Normal full term with no serological nor clinical evidence	65
Serologically positive	11.5
Clinically positive	10
Stillbirths (full term, premature, abortions)	7.5
Of those receiving no treatment:	
Normal full term with no serological nor clinical evidence	0
Serologically positive	2
Clinically positive	1
Stillbirths (full term, premature, abortions)	3

A review of the prognostications of many syphilographers, "Once syphilis, always syphilis," prompted a special study of 150 cases of current pregnancies which had received intensive treatment in previous pregnancies (*Chart 8*). A number had continued treatment while others resumed treatment immediately after the cessation of menses. This series was divided into trimester groups only. Thirty-eight per cent gave birth to normal living babies when treatment was instituted in the first trimester. Forty per cent of the total number began treatment at this time, with only 2 per cent showing two plus serological evidence. In the second trimester, 24 of the 28 per cent receiving treatment resulted in normal living babies with 2 per cent having two plus and 2 per cent four plus serological reaction. The third trimester shows that 10 of the 20 per cent involved in this group were normal. Each succeeding trimester apparently lessens the possibility of normal, healthy babies. It is in this period (third trimester) that the first clinical evidence shows in 2 per cent of the cases, while the remaining 8 per cent is divided into 6 per cent with 2 plus and 2 per cent with 4 plus reaction. There were no abortions, premature labors nor stillbirths in the series.

A group consisting of 12 per cent of this special 150 cases did not resume treatment. Four per cent of these delivered normal babies, showing that occasionally negative mothers after intensive treatment, and even if untreated in their current pregnancies, may have normal babies. It is just as striking that a second 4 per cent resulted in 4 plus evidence, thus showing the necessity for treatment. More interesting still is the 4 per cent of the so-called "cured syphilis" terminating in abortion, prematurity and full term stillbirths. We conclude that no one is justified in assuming that, even though the patient has been cured clinically and serologically, she should not be permitted to attempt

to go through any pregnancy without treatment being resumed upon its onset.

We submit the treatment outlined and given by the Department of Syphilology. The patient is given eight intravenous doses of neoarsphenamine. The initial dose is 0.3 gm., increasing the dose weekly to 0.6 gm. Following the neoarsphenamine treatment, weekly injections of 1 grain mercury salicylate intramuscularly for 12 doses are given. A rest period of one month is allowed and, regardless of the Wassermann and Kahn reaction, the treatment is repeated. Both medications are kindly tolerated. Occasionally there may be mild mercurialism, when bismuth is substituted. The rationale of continuing the treatment up to the date of delivery may be questioned because of the possible damage to already burdened excretory organs. With close observance of blood pressure, urine and subjective symptoms this danger is slight. The average amount of neoarsphenamine given the patient is approximately 2.3 gm. and of mercury 0.5 gm.

The amount of treatment which ordinarily seems infinitesimal, protects in a large percentage of cases both mother and child. It is generally agreed that the pregnant woman, with her defense mechanism at its highest development, is more amenable to treatment than the non-pregnant woman or the syphilitic man. As stated elsewhere in this paper, antisyphilitic treatment must be resumed in every pregnancy regardless of the patient's past history of care or the absence of serological or clinical evidence, if a successful, happy outcome is to be anticipated.

The excellent results that have followed early treatment of pregnancy syphilis has a counter part in lessening the incidence of congenital syphilis. Formerly in the congenital syphilitic clinic it was not uncommon to treat 60 patients in one afternoon. At present not more than 10 are treated.

Following examination in the Pediatric Clinic patients are referred immediately to the Congenital Syphilis Clinic. Serological studies of the blood and spinal fluid are made and the following treatment is instituted: neoarsphenamine intravenously in all cases. A total of 8 doses are given at weekly intervals. The initial dose varies from 0.05 gm. to 0.2 gm., according to the degree of luetic involvement. At the end of 8 weeks, mercury is substituted and is given for a period of 12 weeks. For young infants, mercury ointment (U.S.P.) 38 per cent is rubbed into different areas of the skin each day. For older children mercury salicylate ½ to 1 grain is given intramuscularly. At the termination of this period the blood Wassermann is taken and, if positive, the course of treatment is repeated. If the blood Wassermann is negative a rest period of 6 weeks is given and at the end of this time another blood Wassermann is taken. If negative, a rest period of 3 months is given, then another Wassermann is made. If by chance positive serological findings occur, another complete course is instituted. No case is considered cured under two years of intensive observation and treatment.

Approximately 80 per cent of the cases seen in early infancy and kept under observation and treatment for two years have remained free from positive serological tests. Infants born of syhilitic mothers who have negative blood and spinal Wassermann are kept continually under observation and checked every three months for two years.

CONCLUSIONS

(1) Syphilitic tragedies, including newborns, stillbirths and abortions, have been reduced in our series from 100 to 35 per cent.

(2) Pregnancy does not alter the reaction.

(3) A positive Wassermann and Kahn indicate syphilis though there is no clinical evidence.

(4) The earlier treatment is instituted the more likely we are to obtain living normal babies.

(5) The serological evidence at birth is more important than clinical evidence.

(6) Regardless of treatment there is yet a small percentage of syphilitic tragedies.

(7) Even though the patient has had intensive treatment and is serologically negative, she should have treatment in each succeeding pregnancy.

(8) Treatment has no deleterious effect upon mother or baby regardless of the trimester in which it is instituted.

We are indebted to Dr. C. H. Marshall, Associate Professor of Dermatology, University of Tennessee College of Medicine, for assistance in the preparation of this paper.

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DISCUSSION (*Abstract*)

Dr. Milton Smith Lewis, Nashville, Tenn.—The effectiveness of prenatal antisyphilitic therapy at present is universally recognized. The essayists' charts show conclusively that non-treated syphilitic mothers practically always give birth to syphilitic children. They also show that the number of stillbirths, including full

term, prematures and abortions, is twice as frequent as in the treated cases; and that adequate antisyphilitic treatment carried out early and throughout pregnancy is sufficient to insure the birth of a healthy offspring in the majority of cases, with a corresponding reduction in the number of serologically and clinically positive cases.

Since a non-treated syphilitic mother will practically always give birth to a syphilitic child, the question is, at what period of pregnancy should treatment be given?

It is generally believed that the infection occurs about the fourth month of pregnancy, so if treatment is instituted prior to that time the chances for the birth of a normal, non-infected infant are very great. Because of this belief that fetal infection is more apt to occur around the fourth month, we should attempt to reach the maximum intensity of our prenatal therapy between the fourth and seventh months.

The earlier in pregnancy antisyphilitic treatment is begun, the better are the mother's chances for bearing a healthy infant. On the other hand, in those cases in which treatment is commenced much later and is theoretically inadequate, much may be accomplished, for an amount which would seem meager protects in a large percentage of cases. Therefore, I believe it is never too late to start treatment in a pregnant woman.

As to the antisyphilitic treatment outlined by the essayists, little can be added, but it should be emphasized that it is given without any regard to the date of the initial infection, and without any regard to a negative Wassermann. Also, long-continued treatment before pregnancy is not always a protection for future pregnancies; rather treatment should be given with each pregnancy, notwithstanding the presence of a negative Wassermann reaction.

The analysis of the 150 patients who had had treatment during previous pregnancies, with intensive treatment resumed during the current pregnancy, even though the Wassermann was negative, bears out this statement. The cases treated in the first trimester give the excellent result that 57 out of 60 babies were full term and normal, with only 3 showing a two plus Wassermann.

Treatment started in the second trimester gave 36 full term normal babies out of 42. Six remained either with a two plus or four plus Wassermann, with no clinical evidence of syphilis.

In marked contrast, treatment started in the third trimester gave only 15 out of 30 normal babies, the other 15 showing serological and clinical evidence of syphilis.

In those receiving no treatment in their current pregnancy, only 6 of 18 babies were normal. Six gave definite evidence of syphilis and six terminated in either stillbirth, a premature baby or an abortion.

This analysis alone should impress us with the importance of treating syphilitic mothers early and throughout each pregnancy, regardless of the Wassermann reaction.

It is not the number of treatments prenatally, but the time they are started that is important.

A word about the evidence of syphilis in both mother and baby. I agree with the essayists that a positive Wassermann or Kahn is sufficient evidence of syphilis and should be an indication for instituting treatment. I would go further and suggest that even if the cord Wassermann is negative I would institute immediate treatment in the offspring, for we are well aware of the fact that, due to the mildness of the infection or to some special but unknown defense mechanism, the offspring may appear normal at birth, but develop serological or clinical signs of congenital syphilis a few weeks or a month later.

A negative Wassermann reaction of the cord blood in a child whose mother is definitely syphilitic, although treated during pregnancy, is not sufficient evidence that the baby will escape congenital syphilis.

The prognosis for a serological cure of congenital syphilis depends largely upon how early treatment is instituted and how long it is persisted in.

So it is of paramount importance that every syphilitic woman should be treated during pregnancy without any regard to the date of the initial infection, with no regard to the previous intensive treatment, and finally, without any regard to the Wassermann reaction. In order to do this effectively, it is of the greatest importance that the diagnosis be made as early as possible by a carefully taken history, a careful physical examination, and the performance of a routine Wassermann.

Dr. Jas. R. Bloss, Huntington, W. Va.—Many years ago the importance of this subject was impressed upon me. At that time I was engaged in work dealing with psychiatry and neurology. The number of mental defectives coming under my observation who were victims of congenital lues gave me much food for thought.

For the past twenty years I have been studying this question in its relation to my obstetrical practice. For some eight years a blood Wassermann has been a routine in the examination made at the time I am engaged by the patient. Regardless of the previous obstetric history of the patient, this is done. Social standing and family connections do not excuse the patient from having tests made. Lues, like scabies, may be discovered in unexpected places.

During the prenatal period it is my routine to administer energetic antiluetic treatment. My line of procedure differs somewhat from that of the essayists. It seems to me that there is a danger in giving too large doses of arsenicals to pregnant women. The danger of injury to a liver already taxed is one not to be ignored. For this reason I rarely exceed 0.45 gm. of neoarsphenamine and never give more than 0.5 gm.

I give iodides by mouth through the whole of the prenatal period. I give intravenously eight weekly injections of an arsenical beginning with 0.3 gm. and increasing to 0.45 gm., the smaller dose first to test for an idiosyncrasy. After the course of arsenic, twelve weekly intramuscular injections of a preparation of bismuth are given. My personal opinion is that bismuth is preferable to mercury for intramuscular injections. Frequently in the beginning thirty mercury rubs are given along with the iodide, intravenous and intramuscular treatments. At the completion of the bismuth injections we again start the intravenous arsenic and repeat the same routine up to delivery. No rest periods intervene. The results obtained with this treatment have been encouraging, but I would emphasize the point brought out in the paper, namely: that the earlier in pregnancy the treatment is begun, the more satisfactory will be the outcome.

Some personal observations made in the course of studying the relation of endocrine dysfunction to steril-

ity in the female, which have not as yet been published, are such that I cannot unequivocally agree with the authors' conclusions as to the interpretation of the Wassermann reaction in pregnancy. Three patients seen because of inability to become pregnant showed negative Wassermann reactions. All were found to be hypothyroids. They were put on appropriate therapy. All became pregnant and blood studies in each showed Wassermann plus 1 and Kahn plus 2. This continued through the prenatal period and until the lochia ceased containing blood after delivery, when at once the complement fixation again was negative. Cord blood specimens from the infants were negative. No specific therapy except the endocrine was administered at any time.

The only explanation of this which appears plausible is that the administration of thyroid substance with a resultant pregnancy causes a change in the maternal lipoids which gives rise to a faint Wassermann and Kahn reaction.

It is also to be recalled that the liver of the pregnant woman may show a hypersensitivity to arsenical therapy.

Dr. C. B. Upshaw, Atlanta, Ga.—In discussing this report I should like to present some statistics taken from the obstetric and pediatric departments of Grady (colored) Hospital in Atlanta. This study of syphilis in children was done by Dr. M. Hines Roberts, and it is through his courtesy that I am able to present these statistics. His observations of 903 negro children were made over a period varying from a few months up to six years of age.

Eight hundred fifty of the 903 children were born of syphilitic mothers and 53 had a positive Wassermann reaction, although all blood tests on the mothers had been negative (30 of these remained syphilitic).

Two hundred forty-three of the babies born of syphilitic mothers were syphilitic; 607 were non-syphilitic at the time this work was completed. There is a total, then, of 273 syphilitic infants in this study, yet 103, or 37 per cent, of these had a negative cord Wassermann at birth; 681 infants were born with a negative cord Wassermann and 103, or 15 per cent of this number, as stated above, later became syphilitic, as proven by subsequent blood tests and physical findings. Of the 607 non-syphilitic infants born of syphilitic mothers, 29, or 4.7 per cent, gave positive cord Wassermanns at birth.

From a study of these facts we are forced to disagree with the conclusion of the authors that "The serological evidence at birth is more important than the clinical evidence." A negative cord Wassermann does not eliminate the possibility of syphilitic infection when subsequent follow-up studies in our clinic reveal that 15 per cent show infection. Also a positive cord Wassermann at birth without physical evidence of the disease does not establish the diagnosis of congenital syphilis, when we remember that a small number, 29, or 4.7 per cent of non-syphilitics, had positive cord Wassermanns at birth. I might add that these are also the conclusions of Williams after a routine study of 5,000 cord Wassermann tests in the Johns Hopkins Clinic.

Three hundred seventeen mothers received no treatment and produced 155 infants who have thus far remained free from the disease. It is probable that 15 per cent will subsequently become syphilitic. The remaining 533 mothers received treatment of varying intensity and 81 produced syphilitic infants, or a failure in treatment of 17.8 per cent. One hundred eighty-eight women of this group received 9 or more neoarsphenamine injections and produced only 10 syphilitic infants, or 5.3 per cent failure. So, our findings are in accord with the conclusion that regardless of treatment there is yet a small percentage of failures.

In our out-patient prenatal clinic of approximately 200 patients weekly, about 40 are given antisyphilitic treatment, an incidence of about 20 per cent. We are not so fortunate in securing 50 per cent of the patients in the first trimester. It has been estimated that approximately 25 per cent receive treatments in the first trimester; 50 per cent during the second trimester, and 25 per cent in the third trimester. Our treatments are continuous at weekly intervals, however, after the diagnosis is made.

Finally our concern should not be limited to the prevention of congenital syphilis in the pregnancy at hand. If we are to follow the teachings of syphilographers, these mothers must be kept under observation for years and, as the essayists have advised and practiced, subsequent pregnancies must be guarded by active treatment regardless of the serological reaction.

Dr. T. K. Brown, St. Louis, Mo.—In the routine study of a similar group of cases at the Obstetrical Clinic of Washington University Dispensary, we have found a positive Wassermann in approximately 12 per cent of the cases. I wish to emphasize the importance of the continuation of antiluetic treatment until delivery. If for any reason the treatment is discontinued in the latter weeks of gestation, there will be noted a greater incidence of offspring with positive findings.

It does not seem justifiable to discontinue the treatment during the last weeks of gestation unless there is some serious complication demonstrable in the patient and due to the treatment.

Patients with doubtful serological reactions during pregnancy should be treated.

Dr. E. L. King, New Orleans, La.—In the colored female prenatal clinics of the New Orleans Charity Hospital about 18 per cent of the women who apply are syphilitic.

We feel that all of these patients should be treated intensively, especially for the effect on the baby. We have had some very striking results and we have felt that at times we have saved the life of the baby by the treatment. We do not feel that these babies are free from infection and always advise further treatment in the pediatric clinic.

Dr. Reinberger (closing).—A repetition of certain facts may stress issues brought out in the paper, namely: (1) that all pregnant women should have a routine blood Wassermann and if syphilis is suspected where the blood Wassermann is negative, the spinal fluid should be studied. (2) Treatment should be instituted immediately, for the earlier the treatment is begun the fewer syphilitic complications will arise. (3) The pregnant woman cannot and does not need the large doses necessary in the non-pregnant woman or in the man. Acute arsenical poisoning in the form of acute atrophy with its general manifestations has followed large doses of arsenic. This followed the toxic action of large doses superimposed upon the already damaged liver of the pregnant woman. Our percentage of cures with small doses exemplifies the efficacy of our plan in our end-result study. (4) Whether the treatment should be

continuous is a question for discussion. Our Department of Syphilology feels that a repetition of the treatment is advantageous without periods of rest if the number of months of gestation permit. (5) Of the various medicants used to eradicate syphilis, neoarsphenamine, mercury and bismuth have proven their value in this series. (6) And lastly, attention is focused upon the special group of 150 cases of cured syphilis with the end-result in direct ratio to the time when treatment was reinstituted in each succeeding pregnancy. This gives our Department the dictum "Once syphilis always syphilis" in order to avoid syphilitic tragedies.

SUPRAPUBIC CYSTOTOMY AND BLADDER PARALYSIS*

By MONTAGUE L. BOYD, M.D.,†
Atlanta, Ga.

My purpose in writing a paper upon this subject is to attempt to present some of the points for and against the treatment of bladder paralysis by suprapubic cystotomy which have been brought out from time to time since the year 1914. Also, to emphasize the desirability of collecting and publishing data on the treatment of these cases where infection has not occurred and catheterization has not been employed. And lastly, to re-emphasize the advantage of treating these cases by suprapubic cystotomy when the bladder has become infected.

Suprapubic cystotomy is indicated in three classes of cases of bladder paralysis, namely: (1) those with paralysis which result from acute infections in and about the spinal cord, and from spinal cord injuries caused by traumatic lesions of the spine. The onset of the paralysis is sudden, retention of urine is at first complete, and later automatic micturition develops if the patient lives long enough and is not too seriously sick. (2) Those with paralysis from conditions which gradually produce injury to the spinal cord or the nerves near the spinal cord, such injuries, for example, as are seen in tumors of the spinal cord, tabes dorsalis, and spina bifida occulta. In these cases cystotomy may be indicated when a complete or paradoxical incontinence of urine appears, or even a partial retention of urine from which hydronephrosis and bladder and kidney infections develop and which are controlled only by obtaining adequate urinary drainage. (3) Those cases where incontinence of urine has been caused by the performance of a transurethral resection operation or a prostatectomy upon a patient having paralysis of either the external or internal sphincter, or a partial paralysis of both. This incontinence may occur when a benign prostatic hypertrophy is removed at prostatectomy from certain patients having tabes dorsalis; also, when in removing a benign prostatic enlargement by transurethral resection the internal sphincter happens to be more or less completely destroyed and the external sphincter is also injured, or is discovered after the operation to function inadequately.

Since it is impossible adequately to discuss these three groups today, I am going to limit myself to the first one, expecting to continue my discussion of the other groups in later papers.

SUDDEN PARALYSIS OF THE BLADDER DUE TO ACUTE INFECTIONS AND TRAUMATIC INJURIES OF THE SPINE

No adequate discussion concerning the treatment of the urinary tract conditions, which appear in sudden paralysis the result of traumatic and other serious injuries of the spine, appeared in medical literature (Carver[1]) until many cases of spinal injury were encountered by the medical profession during the late European War (Besley,[2] J. W. Thompson Walker,[3] Kidd[4]). The care of these cases in the military hospitals became a serious problem and the attending urologists readily recognized that the methods which were being employed for treating the subsequent urinary retentions and infections were by no means what they should be.

These cases offered the neurologists and physiologists, who for some years have been interested in the neuropathology and neurophysiology of micturition, the opportunity to collect valuable data upon the effect on micturition of lesions of the spinal cord at different levels, and also, upon automatic micturition and the changes in the urethra and bladder which accompanied and followed it (Fearnsides,[5] Head and Riddoch,[6] Riddoch[7]). To the urologists these cases offered an opportunity to study the problem of how to treat the urinary retention, which always occurred immediately, and, also, how to prevent and combat the urinary tract infections. The urinary retention was during the first part of the War being treated routinely by catheterization, from which the bladder was nearly always infected, and these infections were for the most part responsible for causing the death, usu-

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*Read in Section on Urology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

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ally in a few months, of those who recovered from the immediate effect of the spinal injury (Besley,[2] J. W. Thompson Walker,[3] Plaggemeyer,[8] Cumming,[9] A. E. F. Manual of Military Urology[10]).

There resulted from the studies which were made of these cases two radically different plans of treatment: (1) immediate suprapubic cystotomy, preceded by intermittent catheterization for the relief of the urinary retention until the cystotomy could be performed. (2) Absolutely no catheterization, but allowing the overflow to take care of drainage from the distended bladder, and assisting the bladder drainage by pressing upon the abdominal wall over the bladder. This was to be continued until automatic micturition occurred, and then that reflex was to be assisted by initiating it and increasing its force by rubbing, pinching or irritating the skin over and in the region of the external genitalia and by pressing on the abdomen over the bladder. The advocate of this method contended that patients so treated had, as a result, (1) no serious injury to their general condition; (2) no infection of the urinary tract; (3) no retention of urine in their bladder sufficient to cause the kidney damage which is generally known to be caused by inadequate emptying of the bladder. If their claims can be proven then there exists little reason for the use of suprapubic cystotomy. Unfortunately, however, there have not been, so far as I can determine, enough cases reported to supply the information needed concerning the final results of treatment of these cases without catheterization and without suprapubic cystotmy. And, as opposed to these claims we have certain generally accepted facts about the urinary tract conditions which are constantly present immediately after the paralysis appears, and which continue usually for several weeks, but may continue for months. These are: (1) that the urethra, bladder and the other urinary tissues lying in the zones of paralysis are very susceptible to infection, as is shown by the readiness with which the bladders, for example, are infected by catheterization and the difficulties encountered in control of the infection once it has been established. (2) That retention of urine, as well as the paralysis, predisposes the bladder to infection. And, of course, we have an enormous retention of urine following cord injuries, which continues usually for three to six weeks or longer before automatic micturition begins. (3) That, in these flabby walled, overdistended bladders, where a spastic contraction of the internal sphincter offers marked obstruction to urinary outflow, it must be very difficult, or impossible, adequately to empty the urine by making pressure on the bladder through the abdominal wall. It can be done most satisfactorily in children, quite thin and small persons, but not so well in fat persons, or large ones having big pelves and deeply seated bladders. (4) That in more or less normal people even mild disturbances of the gastrointestinal tract are not infrequently accompanied or followed by the passage of colon bacilli into the blood stream, through the kidneys, and into the urine. And we have in these cases very marked disturbances of the large intestine which one might well expect to be the cause of colon bacilli entering the blood stream. (5) That one of the effects of a retention of urine in the bladder is to cause a retention of urine in the ureters and kidneys, thereby producing a predisposition to kidney infection. And if not infection, at least an impairment of kidney function; for, as Hinman and others have shown, there is an interference with the arterial circulation in the kidney, when the kidney pelvis and calyces remain more or less continuously distended with urine, which results in a gradual functional impairment and an ultimate atrophy of the kidney. If these bladders, then, which are so easily distended, because of the paralyzed condition of the muscle walls and the spastic condition of the internal sphincters, are allowed to remain in varying degrees of distention it seems evident that the kidneys must, in many cases, undergo a progressive injury which would only be stopped or relieved by the establishment of satisfactory intermittent or continuous urinary drainage.

From these facts we may, I believe, draw the following conclusions:

(1) That in these cases the bladder first, and later the kidneys, may be infected by bacteria which reach the urinary tract through a descending or hematogenous route. Urinary tract infections are apt to occur, even though a catheter is never employed. (2) Even though a urinary tract infection does not occur, there exists a danger of progressive and serious kidney damage developing in many cases where the bladder is inadequately drained by assisted automatic micturition (Curtis[11]). (3) Once the urinary tract has become infected, the resulting damage which occurs is greater in cases treated by assisted automatic micturition than in cases treated by catheterization or better still by suprapubic cystotomy.

In addition to the foregoing accepted facts, which relate, as I have said, to the period preceding the appearance of automatic micturition,

we must consider whether or not assisted automatic micturition, even though infection be absent, offers adequate emptying of the bladder to prevent the kidney injury which we very well know does not occur in urinary disturbances where varying quantities of residual urine are found. Here, again, while there is not enough evidence available to prove that the bladders do empty sufficiently, there is some little evidence to show that they do not empty (Head and Riddoch, Head, J. W. Thompson Walker, Plaggemeyer,[8] Cumming[9]). In this connection the following passage from Head's "Studies in Neurology,"[12] 1920, is worth reading:

"If a catheter has been passed within about twenty-four hours of the injury and the urine has not been allowed subsequently to accumulate in excessive quantities, retention usually passes off, giving place first of all to occasional and fitful evacuation. The larger quantity of urine voided in twenty-four hours has to be withdrawn by catheter, but a small amount is passed unconsciously at irregular intervals into the bottle. After a few days in a favorable case this gives place to true automatic micturition. Some urine remains behind after each act of involuntary evacuation and this has to be removed by catheter once or twice daily. Moreover, it is necessary in most cases that some form of wash should be used, if the mucous membrane is to regain its normal condition and complete automatic activity is to be established. Finally, catheterization can be discontinued; urine accumulates in the bladder up to a volume different in each case, and of this a certain proportion is voided unconsciously at each act of micturition. *In many cases some fluid remains behind, but occasionally the bladder appears to be emptied entirely.*" (The italics are mine.)

It must be remembered, however, that this information was obtained from observation made upon infected bladders where the penetrating infection may have caused an impairment in the bladder muscle activity by direct toxic injury of the muscle fibers, as well as by limiting their activity by producing fibrotic changes in the bladder walls.

It seems to me that there can be no doubt as to what treatment to employ in these cases when a urinary infection has already occurred. The report of J. W. Thompson Walker,[3] my own cases[14] and those reported by Dr. Bailey[15] and me illustrate the great benefit which is to be derived from suprapubic cystotomy.

Certainly catheterization, when infection has occurred, does not afford a satisfactory method of treating these cases, and in spite of Kidd's[4] conclusions retention catheters are, in my opinion, definitely contraindicated, because they produce long-continued pressure upon tissues having a susceptibility to damage by pressure, as illustrated by the ease with which bed sores occur in these cases. And there is an added reason why retention and even intermittent catheterization is injurious in the early stages. There exists a spastic contraction of the internal sphincter which closes the products of infection and inflammation in the prostatic urethra, causing an extension of the infection to the prostate, seminal vesicles and vasa, and to the epididymis. Epididymitis is a frequent complication. And, furthermore, it may be that at times the trauma produced by catheters results in lesions of the urethra which are the portal of entry to the blood stream for bacteria which are carried to the kidneys, and so produce kidney infection even in the earliest stages of the paralysis.

In spite of the fact that urinary tract infections, once they have appeared, are much less serious when suprapubic cystotomy has been performed upon these patients, it is evident that the advance of the infection in the bladder is by no means stopped even then. For in spite of adequately maintained, continuous drainage, urinary antiseptics, and bladder irrigations, the urine in nearly all cases is full of pus and bacteria and sometimes quite alkaline, showing the susceptibility of the paralyzed bladder to injury by infection. That the infection, however, with suprapubic cystotomy is limited and superficial, is shown by the absence of fever, which is not usually the case when treatment is attempted by intermittent, or even continuous, catheterization.

The severity of the bladder infections which result from inadequate drainage, tends certainly to an extension of the infection to the kidneys by regurgitation or through the lymphatics, a very serious matter in these cases. However, I would like to call your attention to the fact that bladder infections alone can produce such an elevation of temperature that one can readily be misled into thinking that infection of the kidneys has occurred; for example, in one patient with bladder paralysis and a urinary retention treated by catheterization, in whom I was confident that infection of the kidneys existed because he had a high temperature daily for a week or more, I found by ureteral catheterization that there were neither bacteria nor pus in the kidney urine.

Kidney infections develop in some cases in spite of suprapubic cystotomy. We know this because in some of the cases stones have developed in the kidneys months or years later (Cumming,[13] my cases[16]). It may be that such infections occur in the cystotomy cases (1) when the paralysis is more extensive and permanent (for it has not occurred in my cases where recovery of bladder function has eventually been suf-

ficient to permit the removal of the suprapubic tube); (2) when adequate drainage is not continuously maintained by keeping the suprapubic tube clean and open; (3) when incrustations are allowed to form thickly enough upon and in the suprapubic tube so that particles are broken off and left in the bladder when the tube is removed to be cleaned; (4) when the bladder is not kept free of sediment by frequent irrigations; (5) when the patient does not drink enough water and has too concentrated a urine; (6) when the patient is permitted to lie on his back nearly all of the time. In addition to these things there is, I believe, an additional reason in some cases for stone formation which some of us have overlooked. Monobasic acid sodium phosphate to acidify the urine may cause stones. I have had several cases in which there has been rapid and extensive stone formation while patients were taking sodium phosphate, and I am convinced that it plays a very important role in the formation of urinary calculi in certain cases. I have not seen the same rapid and extensive stone formation when sodium phosphate was not used.

With these things in mind it is readily understood that there are certain self-evident rules which must be observed in treating these cases. (1) Maintain adequate urinary drainage by keeping the suprapubic tube clean and unobstructed. (2) Clean the tube often enough to prevent the breaking off into the bladder of stone deposit when the tube is changed or cleaned. (3) Wash out the bladder once or twice a day with boric acid solution and with the patient lying on his side and the head somewhat elevated. (4) Give urinary antiseptics and plenty of water, distilled, or at least boiled, when the local water supply favors stone formation. (5) Avoid the use of monobasic acid sodium phosphate for acidifying the urine and also in these cases avoid the use of sodium bicarbonate and such other drugs as sodium phosphate (sal hepatica, sedlitz powders) which may assist in causing a phosphaturia.

To enable us to arrive at some conclusive decision as to what is the best treatment for these cases we must have a careful study of the final results of treating uninfected cases without catheterization or suprapubic cystotomy, and this study must be made on a large number of cases, for many years, and with a detailed report in each case. To that end it will be necessary that the urologist obtain the assistance of the other branches of the medical profession by informing them of what we have in mind, so that these cases may come under our observation before relief of the retention by catheterization has become necessary. As suggested by Cumming,[13] intravenous urography will play no little part in deciding what changes occur in the kidneys, ureters and bladder as the result of inadequate drainage, and there should often exist ample reason to justify making such a test as soon as automatic micturition appears, if not before. Cumming (and others also) have pointed out that, in studying and reporting these cases, it is necessary to distinguish between males and females. I add this point for completeness, but have no time left now to discuss it.

Finally, in selecting the type of treatment for these cases, whether infected or not, we must keep in mind the ability of the patient to obtain the attention necessary to carry out any selected plan. There is much to be done for these cases besides the care of the urinary tract. The bed and the patient must be kept clean and bed sores prevented by turning the patient frequently and rubbing the hips and back with alcohol; and he must be given enemas, medicines and water. These things alone are often more than the patient can manage to obtain, and as a result a tube is often the only possible method or channel by which efficient drainage of the urine can be obtained and continued, and through which the bladder can be kept clean with frequent irrigations.

Case 1.—Pied. Hosp. No. 9980. C. A., a man, aged 21, single, logger in a saw mill, was admitted January 29, 1926.

He had a traumatic injury of the spinal cord and fracture of the first lumbar vertebra 18 days before admission. There was complete retention of urine and feces. Laminectomy was done on January 30, 1926, by Dr. Charles E. Dowman. He was catheterized twice a day before admission and catheterization was continued after laminectomy, but when epididymitis occurred a urological consultation was requested and suprapubic cystotomy performed.

He was discharged from the hospital on April 20, 1926, having been out of bed and on crutches for several weeks. The suprapubic incision healed per primam and drainage was satisfactory. The urinary infection was greatly improved, but the patient was not able to void when the tube was shut off.

July 17, 1926.—A letter from the patient's physician at his home said that he was voiding at times and seemed to be gradually regaining control of his bladder and bowels; that he could walk with a cane.

November 6, 1932.—A letter from the local physician said that the patient is in remarkably good physical condition, but gave no other information. The patient did not reply to letters of inquiry.

Case 2.—Pied. Hosp. No. 25671. H. C. B., a man, aged 18, married, a farmer, was admitted August 12, 1930.

He had a traumatic injury of the spinal cord from

fracture of one of the lower cervical vertebrae. He was injured by diving into shallow water six weeks before admission. The urine was infected on admission with a bacillus and there was an acute epididymitis on the right and left of two weeks' duration. He had been catheterized every eight hours since the accident. Spinal puncture showed no complete block of the spinal canal. Suprapubic cystotomy August 13, 1930, was followed by slight infection of skin sutures.

The patient greatly improved as far as the genito-urinary infection was concerned. He was discharged from the hospital on August 23, 1930, wearing a suprapubic tube.

September 15, 1930.—A letter from the patient's home physician said that he was improving and there was some return of muscular control.

August 24, 1931.—A letter from the patient said that he was much better and gradually regaining control over the bladder, rectum and other muscles. His general health was good. He is still wearing the suprapubic catheter.

Case 3.—Pied. Hosp. No. 12992. A boy of 7 was admitted November 9, 1926.

There was a metastatic infection (staphylococcus) of the epidural space in the region of the first thoracic vertebra, with motor and sensory paralysis, and retention of urine and feces. There was a history of furunculosis three or four weeks before the onset of the present illness. The present illness began four weeks before admission to the hospital. Laminectomy was done by Dr. Charles E. Dowman on November 11, 1926.

The patient had been catheterized at irregular intervals from the beginning of the illness, and on admission the urine was infected with a gram-negative staphylococcus. A suprapubic cystotomy was done November 19, 1926. No anesthesia was necessary. A pezzar catheter was left in the bladder wound. Following the operation the patient had fever of 100 to 101°, but his condition remained fairly good, and the suprapubic wound healed satisfactorily. He was discharged from the hospital on December 8, 1926, with no improvement in the paralysis.

January 19, 1927.—He was readmitted to the hospital for observation after four weeks at home. A spinal puncture showed a normal rise of spinal fluid on jugular compression. The suprapubic wound was all right and the tube worked very satisfactorily. It was drained continuously. He was dismissed from the hospital January 29, 1927.

March 27, 1927.—He was seen at home by Dr. Dowman. He had not been doing well. He had been having a septic type of temperature and no improvement in paralysis; was anemic, and had lost a good deal of weight.

November 3, 1932.—A letter from the patient's father said that he died May 5, 1927. He seemed to improve for a short time after leaving the hospital, but rather suddenly became worse and died. The suprapubic tube was left in the wound until the time of his death and worked satisfactorily.

Case 4.—Pied. Hosp. No. 16789. G. D. C., a man, aged 21, single, a miner, was admitted April 24, 1928.

He had a fracture of the lumbar vertebra with compression of the cord, no increase in the spinal fluid pressure on jugular compression, and paralysis of the rectum and bladder. The accident happened seven days before admission to the hospital. A retention catheter was employed from shortly after the beginning of the paralysis.

Laminectomy April 26, 1928, was done by Dr. C. E. Dowman. The appearance of the cord was so healthy that Dr. Dowman was optimistic about recovery.

On admission the urine was infected with a bacillus like Colon and a suprapubic cystotomy was performed May 8, 1928. A pezzar catheter was left in the bladder wound. The wound healed well, but the patient had a swelling of the left leg. He was discharged from the hospital on August 27, 1928, with no improvement in paralysis; temperature normal.

November 4, 1932.—Four years seven months after cystotomy, a letter from the patient said that he had the tube changed every two or three weeks; drained it continuously. He has not voided. In the spring of 1930 two stones formed in each kidney, were passed into the bladder and out through the suprapubic tube. There have been no other stones. Paralysis is just as it was, but the patient is fat and in good health.

Case 5.—Pied. Hosp. No. 19040. J. D., a school boy, aged 19, single, was admitted September 6, 1928.

He had transverse myelitis at the level of the sixth dorsal segment, due either to infection or perhaps to hematomyelia. His present illness began twenty-one days before admission with complete paralysis of the bladder and rectum. He was catheterized for a week after his present illness began and had incontinence of urine (overflow) without catheterization from then until admission. Sensation to touch was lost for two or three days after the onset of paralysis, but then returned.

The urine was infected with a coliform bacillus on admission and a suprapubic cystotomy was done on September 6, 1928, without anesthesia. A pezzar catheter was left in the bladder wound. Laminectomy was not performed. Supporting casts for the feet and legs were applied on October 7, 1928. He was discharged from the hospital about December 1, 1928. The suprapubic wound had healed nicely and the bladder infection had improved a good deal.

February 14, 1928.—A letter from the patient's physician advised that the patient is just about the same; not able to control his urine at all, and when the tube is closed he dribbles constantly.

November 3, 1932.—A letter from the local physician says that the patient died in July, 1931. His urinary incontinence continued and death was due to "ascending urinary infection." No information was given as to whether or not the suprapubic tube was continued and as to how well the drainage was cared for by keeping the tube clean and open.

Case 6.—Pied. Hosp. No. 12956. H. W. E., a man, single, aged 20, a mechanic, was admitted January 1, 1927.

There was a traumatic injury with fracture of the first lumbar vertebra, with partial obstruction of the spinal canal. The accident occurred 24 hours before admission to the hospital. He had complete retention of urine and feces. Catheterization was begun at once. The urine was slightly infected and a suprapubic cystotomy was performed on January 21, 1927. A pezzar catheter was left in the wound and the wound healed satisfactorily. The tube drained very well.

He was able to walk with the aid of crutches two months after the accident, but he was kept in the hospital until October 27, 1927, because stabilization operations were performed by Dr. Michael Hoke for flat foot, first on the left and then on the right.

March 17, 1929.—A letter from the patient said that he was in about the same condition as when he left the hospital, but he took out his drainage tube about January, 1929. He could void without straining, but could not control the urine and bowel movements and could hold only a little water without leaking. He had to void frequently.

April 11, 1929.—In reply to a letter suggesting that he put the tube back, the patient wrote that he preferred to do without the tube. It was eight months after injury before he could void, and during that time the tube was very satisfactory; with the tube out he could hold very little urine, voided frequently, and seemed to have no control of urine or bowel movements.

Case 7.—Pied. Hosp. No. 27964. J. A. H., a man, aged 34, in the oil business, was admitted June 11, 1931.

He had a traumatic injury of the spine due to fracture of the sixth cervical vertebra. There was complete block of the spinal canal and complete paralysis of the bladder and rectum. Laminectomy was done on June 11, 1931. Prognosis, due to the appearance of the cord at operation, was very poor.

The patient was catheterized shortly after the accident, and on admission the urine was found infected with a coliform bacillus. A suprapubic cystotomy was performed on June 13, 1931, without anesthesia.

He was discharged on July 5, 1931, the wound having healed very satisfactorily. There was no change in his bladder and rectal paralysis, nor in the paralysis of the other muscles.

November 5, 1932.—A letter from the patient's wife said that he is wearing the tube, which has been satisfactory. It is changed once every two weeks. Occasionally (once or twice) he has had some fever, which is controlled by urinary antiseptics and increasing the amount of water he drinks. There is no dribbling of urine; the tube is drained continuously. The paralysis is about the same as before, though he has gained some strength in his arms, but no feeling. There are no symptoms of stones in the bladder or kidneys. His general condition seems good.

Case 8.—Pied. Hosp. No. 22117. D. G. J., a man, aged 39. married, a farmer. was admitted July 24, 1929.

He had an injury to the spinal cord by a fragment of bone, the result of traumatic fracture of the first lumbar vertebra. There was acute retention of urine and feces. Laminectomy was done on July 25, 1929, by Dr. Charles E. Dowman.

The patient was catheterized from shortly after the injury, which occurred the day before admission. On the day of admission, his urine was infected slightly with a coliform bacillus. Suprapubic cystotomy was performed on July 26, 1929, and the patient did very well after operation. There was no infection of the wound. Bladder infection was controlled very well, and at no time was the urine very dirty. He was dismissed from the hospital on August 4, 1929.

October 29, 1932.—Three years and three months after cystotomy a letter from the patient says he still uses the suprapubic tube just as it was employed at the hospital. The paralysis is just the same as it was. He sits up every day, but has no use of his legs. The urinary salts deposit quite rapidly on the tube. He is not able to void, and has no incontinence of urine as long as the tube remains open. He has no symptoms of a stone in the bladder or kidneys. His general health is fairly good.

Case 9.—Pied. Hosp. No. 14298. G. L., aged 17, single, school girl, was admitted June 27, 1927.

She had a traumatic injury of the spinal cord as the result of a fracture of the twelfth thoracic vertebra and complete retention of urine and feces. The accident occurred three days before admission to the hospital, and she was catheterized from shortly after the accident until her admission. The urine was infected with a coliform bacillus.

Jugular compression showed complete obstruction of the spinal canal and a laminectomy was performed by Dr. Charles E. Dowman on June 27, 1927. The spinal cord was found to be crushed.

A suprapubic cystotomy was done on July 1, 1927. The wound healed satisfactorily and the tube worked well up to the time of discharge, July 25, 1927. Her temperature before and after operation was 100 to 101°, but gradually it came down until it was only 99.5° when she was discharged.

May 30, 1932.—About five years after cystotomy, the patient is still wearing the suprapubic tube. She has had no stones in the kidneys or bladder. She has some incontinence of urine if the suprapubic tube becomes at all stopped up, but has been able to go around in an automobile, in a chair and on crutches with assistance since a few months after she left the hospital. Her urine remains infected, but she has no trouble with the urinary drainage, nor has she any evidence of acute attacks of cystitis or pyelitis. Her general health is fairly good and she has not had to remain in bed for a year or two on account of sickness.

Case 10.—Pied. Hosp. No. 21473. F. McC., a man of 26, married, was admitted May 3, 1929.

He had a traumatic injury of the spinal cord at the eleventh dorsal segment as a result of fracture of the spine. There was retention of urine and feces. He was catheterized before admission and the urine was infected with a coliform bacillus. Suprapubic cystotomy was performed on the day of admission and a 24 F. pezzar catheter was left in the wound.

Spinal puncture showed complete block, without any rise in pressure with compression of the jugular veins. Laminectomy was done on June 12, 1929, by Dr. Charles E. Dowman and a pressure myelitis discovered. He was discharged from the hospital on June 26, 1929, having done very well as far as suprapubic operation was concerned. The wound healed without infection and the tube worked well. He had some pressure sores over the sacrum, which had improved when he was discharged.

October 27, 1932.—A letter from the patient's father said the patient's condition was good, but the paralysis is about the same as when he left the hospital. He was operated upon in Asheville, North Carolina, for stone in his bladder.

He is still wearing the suprapubic tube and draining it continuously. No further information about his present condition is obtainable so far.

Case 11.—Pied. Hosp. No. 19138. K. N., a man, aged 25, a widower, an auto salesman, was admitted July 19, 1928.

He had had a traumatic injury to the spinal cord from fracture of the seventh dorsal vertebra, with retention of urine and feces. He was catheterized from shortly after the injury, which was nine days before admission. Suprapubic cystotomy was done on July 21, 1928, with the pezzar catheter left in the wound. The wound healed nicely and there was comparatively little cloudiness of the urine after insertion of the tube.

His general condition was good and the patient was dismissed from the hospital on August 16, 1928.

September 4, 1928, he was readmitted with bed sores and the paralysis just as it was on discharge, August 16. Otherwise he was in pretty good condition. He was in the hospital for only a few weeks.

October 27, 1932.—A letter was received from the patient four years and four months after cystotomy. He has been changing his own tube most of the time, though he has been under the care of Dr. R. E. Cumming, of Detroit. In January, 1932, Dr. Cumming removed a kidney stone about 3 or 4 cm. in diameter from the kidney. The patient writes that he has been doing well since then, has gained weight, and has not seen a doctor since. He has been operating a riding stable.

Case 12.—Pied. Hosp. No. 13854. T. D. O., a man, aged 29, single, was admitted May 5, 1927.

Traumatic injury of the spinal cord followed fracture of the eleventh thoracic vertebra. There was no elevation in pressure of the spinal fluid on pressure over the jugular veins. Laminectomy was done by Dr. Charles E. Dowman immediately after admission to the hospital on May 5, 1927.

Complete retention of urine and feces existed from the time of the accident, which was three days before admission to Piedmont Hospital. He had been catheterized about every five or six hours since injury, and on admission the urine was infected with a coliform bacillus.

Suprapubic cystotomy was performed on May 11, 1927, and a pezzar catheter left in the wound. The suprapubic wound healed without complications and the patient got along very well. He was discharged from the hospital on September 29, 1928, wearing the suprapubic tube, and without any recovery of movement or sensation, bladder or rectal control.

November 4, 1932.—A letter from the patient, five years and six months after cystotomy, said that he had been in one of the Government hospitals since leaving the Piedmont Hospital, and he had done very well. About a year after leaving, his tube was not kept open well and he passed a number of small stones through the tube. He had been having some attacks of "pyelitis" which were very severe, but none for two or three years. Since that time he has been doing very well. The tube has been kept open and clean and the patient's general condition is quite good. He is up in a chair most of the day and though he has no control of his bladder or urine, he has no incontinence of urine as long as the suprapubic tube is draining satisfactorily. I saw the patient November 15, and he looked well and the wound about the tube was very healthy.

Case 13.—Pied. Hosp. No. 12755. J. D. R., a man, aged 37, married, was admitted December 19, 1926.

Injury of the spinal cord followed fracture of the twelfth thoracic vertebra, which occurred eighty days before admission to the hospital. He was catheterized intermittently following the accident, having had complete retention of urine and feces. Two weeks before admission automatic micturition began and catheterization was discontinued.

Laminectomy was done by Dr. Charles E. Dowman on December 21, 1926, and the spinal cord was found to be crushed.

The urine was infected with a coliform bacillus, but it was almost clear. A suprapubic cystotomy was done on December 27, 1926, and a pezzar catheter left in the wound. The wound healed without infection and the patient left the hospital on January 9, 1927.

June 4, 1927.—A letter from the patient's local physician said that the patient died in May, 1927, but no other information could be obtained. There were no answers to letters of inquiry.

SUMMARY

(1) There is today only sufficient time for discussing the first of three groups of cases in which I believe that suprapubic cystotomy is indicated. These groups include: (1) Those cases with sudden paralysis resulting from acute infections in and about the spinal cord and from traumatic injuries of the spine, producing more or less extensive injuries of the spinal cord or spinal nerves. (2) Certain cases of paralysis of the bladder with spinal cord and spinal nerve injuries caused by spinal cord tumors, tabes dorsalis, spina bifida occulta, etc. (3) Those cases with injuries of the bladder sphincters caused by operation which are sufficient to cause a more or less permanent and complete incontinence of urine.

(2) Nearly all cases with acute retention of urine from sudden paralysis of the bladder coming from spinal cord and spinal nerve injuries are catheterized before the urologist sees them and as a result all, or nearly all, have bladder infections.

(3) We have not yet reported in the literature a sufficient number of cases without urinary infection and treated without catheterization to enable us to draw worthwhile conclusions about the results of that plan of treatment.

(4) But we have knowledge of certain facts which lead us to suspect that many of these cases would acquire a urinary tract infection even if they are never catheterized.

(5) We also have knowledge of the injurious effect of urinary retention upon the kidneys, and from certain published facts we are led to suspect that these cases, treated without catheterization or cystotomy, have varying quantities of residual urine, and eventually serious impairments in kidney function.

(6) From the information in medical literature about bladder infections in these cases, it would seem that the best method of treatment is to obtain the most efficient type of bladder drainage and that I believe is by suprapubic cystotomy.

(7) It is very desirable for all urologists, and the medical profession as a whole, to cooperate in observing cases of bladder paralysis which have been treated without catheterization and in reporting the results of that plan of treatment.

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16. My cases Nos. 4 and 11.

DISCUSSION *(Abstract)*

Dr. Jefferson C. Pennington, Nashville, Tenn.—In my own practice I recall seven cases of paralysis of the bladder due to injury to the cord. All of these had fractures of the cervical vertebra caused by diving into shallow water which was thought to have been deep. Five of these did not survive the injury to the central nervous system. They lived from one to three weeks.

One patient lived for eight months and died of pneumonia. He never recovered any of his nerve function. One patient recovered completely within six months and had no evidence of injury except a slightly crooked neck. I have observed a clinic patient who broke his neck nearly two years ago. There are no evidences of nerve function restoration in this patient. All of these patients had suprapubic cystotomies immediately after the bladder had become distended with urine. I firmly agree with Dr. Boyd's idea that these patients should not be catheterized frequently, and that they should not wear an indwelling urethral catheter. As Dr. Boyd has pointed out, they invariably develop other complications such as prostatitis and epididymitis. It seems to me that our main purpose in these cases is to preserve the musculature, so that the bladder will be able to function in case sensations return.

The high temperature sometimes seen in these casses is attributable to some cause outside the bladder. A bladder lying quiet and undisturbed in the presence of overdistension would not be very apt to cause an elevation of temperature. It is the hyperactive bladder with its congested muscles and cracked mucosa which seems most likely to cause fever.

It has been my routine practice to have these bladders irrigated through the suprapubic tube twice daily with sterile distilled water, and I use this in all bladders where for any reason a suprapubic cystotomy has been done. I have tried various antiseptics such as boric acid, potassium permanganate, and acriflavine, but none of them seems to give as good results as sterile distilled water.

Dr. Chas. F. Lewis, Birmingham, Ala.—There can be no question that the end to be sought in these cases is efficient drainage with the minimum ill effects by trauma, infection and otherwise. How this will best be accomplished will vary to some extent with the circumstances attending the case. I know very little of the end-results in cases left to establish automatic micturition without some artificial means of draining the bladder.

When we take into account the fact that only a few minutes of very forceful distention of the bladder result in numerous rents in the bladder mucosa, which may be observed as bleeding streaks on cystoscopic examination, it would seem very injurious to allow continued distention of the bladder.

I, too, feel that the retention catheter should be condemned. This leaves, then, the two methods: (a) intermittent catheterization; and (b) cystotomy, as the seemingly most satisfactory ones to adopt.

Only those who can have the services of some one skilled in instrumentation should be put on intermittent catheterization. Cystotomy reduces the systemic effects of infection to a minimum.

Dr. Boyd (closing).—In my experience much depends in these cases upon good nursing attention, especially when the paralysis, of which the bladder paralysis is a part, is extensive. Death, which results in the first few months from the condition causing the paralysis and from complications, is rare in the private cases where nursing and medical attention are usually adequate. But among the charity hospital cases, I am sorry to say, death is not infrequent in the first few months, and is to a large extent the result of insufficient nursing care. I call this to your attention to emphasize the importance of performing suprapubic cystotomy in many instances to cut down as far as possible the amount of nursing which these patients must receive at home so that it will be possible for them to be turned frequently, receive alcohol rubs and be kept dry and clean. Many of my patients come from outside of Atlanta and are returned to their homes in rural communities, where they are either unable to procure

adequate attention from physicians and nurses or are poor and unable to pay for such attention.

Furthermore, let me emphasize the need for urologists to take an active rather than a passive interest in these cases and urge you again to begin at once to obtain the information which is needed to enable us to decide definitely what method of procedure is best suited to the different type of bladder paralysis case.

FRACTURES ABOUT THE ORBIT*

By S. S. EVANS, M.D.,
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Modern transportation has brought a marked increase in fractures of the facial bones. Along with the usual percentage from athletics and other sources these cases have indeed ceased to be infrequent. The resulting deformities and other complications make the subject one of increasing importance. Since the nasal accessory sinuses are usually involved, these cases are justly in the hands of the rhinologist, who should be prepared to restore the function of these parts.

A review of the literature will show only a few articles mostly within the last four or five years, and with as many different opinions in regard to handling the case. Morton,[1] of Minneapolis, contributed a paper in 1894 on "Fractures of the Orbital Wall and Margin." Until recently the dental and oral surgeons have been the chief contributors.

Fracture of the nasal bones is naturally the most frequent of this group. These fractures are usually comminuted and often compound. We are all familiar with these cases and with the methods of reducing them. They can be reduced by a blunt elevator intranasally with the fingers of the other hand externally as a guide. Intranasal packing will hold the simpler ones in place along with a dental compound splint molded to fit the nose and strapped with adhesive. Due to the abundant blood supply here as in other parts of the face, these fractures unite quickly and early reduction is, therefore, to be urged.

Penetrating wounds should be cleansed as thoroughly as possible and handled surgically. On account of the legal aspect of these cases, roentgenograms should be made when possible.

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

The next in order of frequency is the fracture of the malar at about its articulation with the frontal, temporal and superior maxilla. The malar is driven in the direction of the force of the blow. Here a roentgenogram is almost indispensable. The plate will show a cloudy antrum on the affected side and a change in the transverse diameter of the orbit. Palpation will elicit a break in the continuity of the lower rim of the orbit.

According to Shea, a study of the normal orbit in the antero-posterior position will show a line in the outer third made by the junction of the outer orbital wall and the skull. This line bears a constant relationship to the outer rim of the orbit and may be used to tell whether the malar has been displaced. The transverse diameter is increased in the outward displacement and decreased when the malar is rotated inwardly.

Goldthwaite[2] reported two cases in 1924 of fracture of the orbital rim by a blow on the cheek. The bone gave way at the suture of the malar with the superior maxilla and the whole inner half of the malar was driven into the superior maxilla, telescoping the antrum. The cases were repaired by making an incision above the last molar tooth and inserting a flat periosteal elevator under the zygomatic arch and rotating outward.

Naftzger[3] gave an excellent description of these cases in 1928 with a clear outline of treatment and complications. He advocated the open operation through the canine fossa as in a radical operation. This gives a direct view of the displaced bone and it is, therefore, more easily reduced. The operator is enabled to remove all separated fragments and by taking down the nasoantral wall to establish free drainage, which he believes essential to guard against infection.

Roberts,[4] in a paper published a little later the same year, gave a review of the literature and reported a case of "Fracture of the Zygomatic Arch" offering a method of reducing these fractures by making a stab incision about three-fourths of an inch below the outer canthus and inserting a screw into the bone through this stab incision to lift the bone into place. His arguments in favor of the method were its simplicity and its little or no scarring.

Gill[5] suggested the use of special forceps, similar to large towel forceps. The bone is grasped through the skin and traction is applied with palpation as a guide. Like the procedure out-

lined by Roberts, the advantage lies in the simplicity of the procedure and lack of scarring.

Shea[6] advocates window resection as in the ordinary intranasal antrum operation below the inferior turbinate. This is a very simple method with, of course, no visible scarring. A number seven Ritter sound is introduced through the antral window and with the other hand over the fractured bone it is pushed into place. Gentle tapping with a mallet often aids in dislodging a securely fixed fragment. A rubber tube is inserted through the window to afford better drainage.

If the wall is badly comminuted, the open operation is to be desired as in radical surgery.

It is the opinion of the writer that this is the safest procedure and a very simple one as well. It is also similar to our usual surgical procedure in sinus cases. It has the advantage of free drainage which has long been the first principle of surgery. This is important in these cases because tearing of the mucosa will fill the antrum with a clot. This as a rule becomes infected and adds to the danger of further complications. Packing is as a rule unnecessary.

Naftzger describes another as a transverse fracture through the malar bones, orbit and nasal bones in which the entire upper jaw and face is movable. The teeth may follow the excursion of the lower jaw, dropping down from 1 to 2 cm. when the mouth is opened and giving the features an elongated appearance. This can be held in place by a plate or tray of dental compound fastened to suitable headgear. As in fractures of the alveolus, the dental surgeon is almost indispensable. The making of supports and wiring of teeth, restoring normal occlusion, are entirely in his field.

Fracture of the superior wall of the orbit usually involves the frontal sinus. If there is no depression, the naso-frontal duct will usually take care of the drainage. Depressed fragments should be lifted into place and the posterior wall or inner plate examined for injury there. Fragments here should be removed and the wound cleansed and drained externally.

Morton quotes von Holder as stating that out of a series of 86 fractures of the base, 79 extended into the roof of the orbit.

There is also a fracture of the outer rim by a blow across the temple. This frequently involves the lacrimal gland, resulting in abscess or fistula, and is of interest to the ophthalmologist.

Fractures of the ethmoid are usually from penetrating wounds. These should be cleansed thoroughly and adhesions should be kept down. Fractures of the sphenoid are not so common and should receive the same care as ethmoidal fractures.

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DISCUSSION (*Abstract*)

Dr. John J. Shea, Memphis, Tenn.—The rhinologist is best prepared to handle these fractures and by obtaining good results he can convince the general surgeon that these cases belong to his specialty.

The majority of the fractures of the facial bones, exclusive of the simple nasal bone fractures, extend into the maxillary, frontal or ethmoid sinus. The fractures about the orbit differ in their severity according to whether or not they involve the sinuses. The deformity most commonly found is in internal displacement of the outer wall of the orbit. This wall is formed by the malar bone. If the anterior wall of the antrum is depressed by the fracture, this wall must be elevated before the malar bone can be reduced to its normal position. Therefore in multiple fractures of the face an open reduction is all that is necessary for antral cases, but a simple external reduction is all that is necessary in uncomplicated malar fractures. This latter procedure can be accomplished by using a large towel forcep. The bone is grasped through the skin and traction is applied with palpation as a guide. When the frontal sinus is involved the procedure of choice depends upon whether or not there is a compound fracture into the frontal sinus. If there is an opening into the frontal sinus, drainage should be established.

An important factor in the handling of sinus fractures is the question of blood clots within the sinuses. Should the clots remain unabsorbed, then the sinus should be cleansed by irrigation or the clots may become purulent.

Protection of the parts after they have been reset is a question of choice. It is our custom to protect them by molding a light splint of dental wax over the area.

Dr. Evans (closing).—There are two points which I wish to emphasize in concluding the discussion: first, early reduction of the fractures; and second, drainage. Because of their rich blood supply these fractures unite early and a blood clot filling the sinus is a potential source of infection.

THROAT MANIFESTATIONS OF THE BLOOD DYSCRASIAS*

CASE REPORTS

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There is a natural tendency on the part of those whose practice is confined to one of the special fields of medicine to magnify those symptoms which pertain to that field, and likewise there is possibly an inclination to minimize symptoms relating to the body condition in general. Theoretically, a patient should first consult a general practitioner or diagnostician who establishes the diagnosis. In order to do so it is at times necessary to call in consultants, such as otolaryngologists and urologists. Should a diseased condition be found in the ear, nose or throat tissues, the patient is referred to an otolaryngologist for proper therapy. As a matter of fact, the majority of our patients (and particularly is this true of those of us who practice in small cities) are composed of an intelligent class of people who have correctly, or perchance incorrectly, diagnosed their ailment as one pertaining to our special field and who consult us without first having had a general examination. This reversal of procedure places upon us added responsibility. We must determine if the case is one which requires the services only of an otolaryngologist, if consultation with internists, for example, is necessary or if the case should be referred in its entirety. Should one, through ignorance or carelessness, attack the local manifestation of a systemic disease without consideration of the general manifestations, irreparable harm might be done.

Hematology, long considered of major importance to the internist, has lately been attracting the deserved attention of otolaryngologists. Some of the blood dyscrasias present certain oral or pharyngeal lesions, and these manifestations may prompt patients to consult us primarily. It might not be amiss to consider those symptoms which would suggest the presence of a blood dyscrasia.

On reviewing the subject we are reminded that oral pharyngeal lesions may be found in anemias due to infections, the acute leukemias (or in acute exacerbations of chronic leukemias), agranulocytic angina, aplastic anemia, and acute infectious mononucleosis. These diseases present such a variety of symptoms that it would probably be better to discuss each separately.

ANEMIAS DUE TO INFECTION

Following Ordway and Gorham,[1] I have classed all anemias due to infection in one group. They are particularly important to otolaryngologists in that they may develop as a complication of a condition already under our care. In the acute (febrile) anemias the onset is sudden, frequently accompanied by headache, vomiting, epistaxis and fever. The early symptoms may suggest scarlet fever or pneumonia. In the anemias due to subacute or chronic infections the symptoms are those of the underlying disease, such as pyelitis, necrotic throat lesions, tuberculosis, syphilis, *et cetera*. Headache, vomiting, chills and fever may be present. Physical examination reveals pallor, fever and signs of localization; the latter may include inflammatory or necrotic throat lesions.

THE LEUKEMIAS

Many cases of acute myelogenous leukemia have developed at the same time as, or following, infections such as tonsillitis or an abscessed tooth. Most often the patients are under 25 years of age, though cases 60 years of age are recorded. The patient is taken suddenly ill with high fever, headache, general malaise and extreme prostration. The gums frequently are swollen, red and spongy, with a marked tendency to hemorrhage. The tonsils are enlarged. Necrotic or gangrenous ulcers may form in the mouth or throat, frequently involving the tonsils. The regional lymph nodes of the jaw and neck enlarge rapidly. There are other types, but this is the one most interesting to us. On examination the patient appears toxic and there is a noticeable pallor. The most characteristic lesions are in the throat, where the leukemic process often leads to swelling, ulceration and gangrene of the pharynx and tonsils, and may involve the gums and cheeks.

The history given by the patient suffering with acute lymphatic leukemia is practically the same as that given in acute myelogenous leukemia; furthermore, on physical examination, the findings are identical.

The chronic leukemias have a gradual onset and are most frequently found in patients of middle age. Ear, nose and throat symptoms are usually noted only in the later stages or with an acute exacerbation. However, patients with chronic myelogenous leukemia have a marked tolerance for head colds; epistaxis is not uncom-

*Read in Section on Ophthalmology and Otolaryngology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

mon and may be an early symptom. In chronic lymphatic leukemia the tonsils are frequently considerably enlarged; this might lead to tonsillectomy before the true nature of the condition is suspected, and severe hemorrhage and death may follow.

Chloroma, a rare type of blood dyscrasia clinically related to the leukemias, may have an acute onset with severe anemia, fever, stomatitis and ulcerative and gangrenous lesions of the mouth and throat. Usually nodules form in the orbit and such a case presents rapidly increasing exophthalmos with loss of vision.

AGRANULOCYTIC ANGINA

Agranulocytic angina (also known as agranulocytosis, granulocytopenia, granulopenia angina and malignant neutropenia) was first described by Schultz[2] in 1922; since then numerous clinicians have reported cases. It may occur at any age, but is more often found in young adults. It most often affects the female sex (75 per cent). The onset is usually acute, though it may follow prodromal symptoms. It may be ushered in with high fever (101 to 105° F.), sore throat, general malaise and difficulty in swallowing. The usual concomitant signs of an acute infection are to be expected; the patient may be moderately toxic. Inflammatory changes are almost always found in the oral cavity and may be found in mucous membranes elsewhere; the most frequent are ulceration and necrosis with membrane formation. The membranes may be described as non-marginated with overhanging edge or with no surrounding inflammatory reaction; it may be attached to healthy tissue as well as to ulcerated areas; its appearance so strongly suggests diphtheritic membranes that several cases have been tentatively diagnosed as diphtheria. These lesions usually involve the tonsil or pharynx, though they may be found at any site. There is a characteristic lack of cellular response. Enlargement of the cervical lymph nodes is usually noted. The mortality is quite high; 82 per cent of 150 reported cases proved fatal.[3]

Case H2773.—(This case was previously reported by McLester and Parsons.[4]) A young white school girl, age 15, was admitted to the hospital on June 15, 1931, complaining of chills, fever, sore throat and a general feeling of illness.

Her family history was negative and her past history was not pertinent, save that her tonsils had been removed at three years of age. She gave a history of nausea, vomiting, chills and fever, with intervals of feeling well and having normal temperature for the previous 15 days. During this time she had had two typhoid vaccine inoculations and rather large doses of quinine. During the last four days she complained a good deal of sore throat.

Examination revealed a moderately well developed, rather undernourished white girl. The anterior cervical lymph nodes were palpable, enlarged and tender. General examination was otherwise negative. The nasal tissues were congested, but ventilation was fair and no pathological condition was noted. There was a moderate degree of gingivitis. The tonsils had been removed, but there was a small remnant at the base of each fossa. There were two small superficial ulcers, covered with a grayish white membrane, on the pharyngeal surface, just medial to the right posterior pillar.

Laboratory examination revealed:

Blood	
Total erythrocytes	3,310,000
Hemoglobin (corrected Tallquist)	62
Color index	.84+
Total lymphocytes	1,100
Small lymphocytes	95
Large lymphocytes	5
Malaria	None found
Platelets	240,000
Wassermann	Negative
Kahn	Negative
Blood culture	Negative
Urinalysis	Negative

Smear from gums revealed a few leucocytes, a few squamous epithelial cells, numerous gram-positive cocci and no Vincent's spirillae or fusiform bacilli.

Smear from throat revealed no pus cells and rare gram-positive diplococci.

Culture from throat revealed some gram-positive staphylococci (albus), few gram-positive streptococci (chains of 2 to 20, no hemolysis) and rare gram-negative bacilli.

Treatment consisted of 250 c. c. transfusions, adenine sulphate intravenously, x-ray therapy over long bones, general ultraviolet treatment and mild astringent applications to the throat.

Since the progress of the throat condition may be of interest to this group, I will give it in more detail. During the first three days the ulcers enlarged and a small one appeared on the left posterior pillar; at the same time the right anterior cervical nodes became very much more enlarged. On the fourth day the ulcers began decreasing in size, followed later by a very much slower decrease in the glandular enlargement. The gums also improved. The ulcers were entirely healed on the ninth day. She was discharged from the hospital as cured on the sixteenth day, her white blood count on that date being:

Total leucocytes	11,800
Small lymphocytes	37
Large lymphocytes	6
Large monocytes	6
Neutrophils (24 immature forms)	50
Eosinophils	1

She has been under observation since that date and has presented no evidence of a recurrence. It might be worthy of mention that she has since been found to be allergic; she is sensitive to horse dander and had an attack of hay fever, perennial type, following an unusually long horseback ride.

APLASTIC ANEMIA

Aplastic anemias are classified as primary and secondary. The former is very rare, but is similar in its symptom complex to the latter. The

two types will therefore be discussed as one. The secondary type has been found following exposure to benzol, trinitrotoluol, x-rays and radioactive substances, the administration of arsenic, and, rarely, following severe infections. In taking the patient's history this information should be elicited. Young people from 15 to 30 years of age are usually affected, but there are, of course, exceptions. The previous health has usually been good, though some cases are of the "chlorotic type." Fever of irregular type and of moderate severity is usual. Epistaxis is frequent and hemorrhages may occur from any of the mucous membranes. Sore throat may be a complaint. The most striking signs noted on examination are that the patient appears profoundly ill and has a peculiar wax-like pallor. Petechial spots may be found on the buccal or pharyngeal surfaces. The tonsils may appear hypertrophied and inflammatory changes may take place.

Case H3335.—A white man, single, age 33, service station attendant, was referred to me at 4:30 a. m. November 13, 1931, complaining of sore throat, hemorrhage and feeling "sick." He was so toxic that his history was not taken till later. The family history was essentially negative and the past history was irrelevant. Apparently his illness started some three months previously, when he contracted gonorrhea and syphilis at the same time. Besides other medication, six intravenous injections of neoarsphenamine were given, the largest dose being 0.3 gram.

For two weeks he had complained of sore throat and malaise. During that time he took some quinine, but could not state definitely how much he took, probably not more than 100 grains. Eight days previously he consulted his family physician; at that time his right tonsil was somewhat swollen and his temperature was 102°. The throat was treated, an astringent gargle and a purgative prescribed and he was ordered to bed. Three days later he began expectorating blood. In the meantime the right tonsil had continued swelling and on the following day (four days prior to my examination) his physician opened the anterior pillar at its junction with the tonsil. The physician stated that some grayish pus and serum drained from the opening, later followed by blood. He bled rather freely for several hours before the blood clotted, and since then had expectorated blood more or less continuously. He took no nourishment save buttermilk and constantly grew weaker. During the night of November 12 he breathed with a rattling noise; his physician feared some respiratory obstruction and referred him to me without delay.

On examination the patient was found to be a well-developed but markedly emaciated white man, very toxic and moderately jaundiced. The lips and finger nails were almost colorless. Temperature was 100°, pulse 130, respiration 16, blood pressure 110/45. The whole right side of the throat was markedly swollen, the uvula being pushed over against the left tonsil, which was normal in appearance. The right tonsil was covered with a mass of dark, foul-smelling clotted blood. This clot was removed with forceps and was found to extend some two inches down the throat, giving rise to a rattling sound when breathing. Several of the anterior cervical lymph nodes were palpable, but not greatly enlarged. They were not fixed or tender to palpation. Examination otherwise was negative.

The history and findings were quite suggestive of a peritonsillar abscess, complicated by a rather severe anemia due to hemorrhage. The swelling was so great that it was thought best to open the peritonsillar area at the site of e'ection. No pus was obtained, but a large quantity of old dark blood, with some fresh blood, drained from the tissues. A small rubber tube was inserted in the incision to facilitate free drainage.

Laboratory examination revealed:

Blood	
Total erythrocytes	1,690,000
Hemoglobin	47 (corrected Tallquist)
Color index	1.47
Total leucocytes	1,500
Small lymphocytes	74
Large lymphocytes	3
Large monocytes	3
Neutrophils	20 (8 immature forms)
Malaria	None found
Total platelets	80,000
Bleeding time	2 minutes
Coagulation time	19 minutes (venous)
Clot retraction time	No retraction in 96 hours
Icterus index	20
Blood culture	Negative
Wassermann	Negative
Kahn	Negative
Urinalysis	Negative

Smear from throat revealed streptococci, fusiform bacilli and Vincent's spirillae.
Culture from throat revealed staphylococci and streptococci.

In spite of the most energetic treatment, including several transfusions, he grew gradually weaker and succumbed on the fifth day. On autopsy, the following summary of findings was recorded: skin and sclerae jaundiced (this was thought due to the effect of the neoarsphenamine on the liver); numerous purple spots the size of a match head over both lower extremities; numerous petechial spots on the visceral pleura; no red marrow in the marrow cavity of the long bones.

The final diagnosis was aplastic anemia, secondary to arsenic poisoning.

ACUTE INFECTIOUS MONONUCLEOSIS

Although there is a difference of opinion, the majority of internists consider acute infectious mononucleosis and glandular fever identical. This difference of opinion is of no particular interest to us, except that the epidemic form is, of course, more readily recognized. Sporadic cases in young adults frequently suggest the aleukemic stage of acute lymphatic leukemia, but the patient never appears toxic. In sporadic cases among children the onset, with moderate fever and sore throat, is so suggestive of tonsillitis that the case is usually diagnosed as such. The sinuses and nasal tissues may be involved. Enlargement of the cervical lymph nodes is usually noted about the third day, the maximum

size being attained by the sixth day; slight enlargement of the spleen, axillary and inguinal lymph nodes is usually noted. Spontaneous recovery usually occurs.

Case H3551.—A white school boy, age 16, presented himself on April 12, 1932, complaining of fever and enlargement of the cervical lymph nodes. The family history was negative and the past history was irrelevant, save that tonsillectomy had been performed several years previously. He gave a history of having had a general feeling of malaise with 101° temperature six days previously. In spite of purgatives and rest, the feeling of malaise, with chilly sensations and fever, persisted, and on the fifth day there was a small hemorrhage from the right naris as well as a feeling of marked nasal stuffiness. During this time he had blown a thick muco-purulent discharge from his nose and had expectorated a fairly large amount. On the fifth day he noticed for the first time a gland on the right side of the neck; it was about the size of a marble, but not painful to touch.

On examination the patient was found to be well developed and well nourished. His cheeks were flushed, but he did not appear toxic or acutely ill. The nasal septum was normally straight, but all nasal membranes were markedly congested. Ventilation was poor and some muco-purulent discharge was noted in both middle and superior meatuses. Transillumination revealed slight cloudiness of both antra, the left being slightly more cloudy; the frontals were not well developed. Posterior rhinoscopy revealed a moderately profuse discharge posteriorly from both middle and superior meatuses; a moderate degree of pharyngitis was present. The tonsils had been removed, but there was a small stump in the base of the left fossa. No ulcers or membrane formation were noted. The anterior cervical lymph nodes were enlarged, ranging from the size of a pea to a marble. They were firm, but not fixed or matted together and were not painful. His temperature was 99°. General examination otherwise was negative.

On laboratory examination the erythrocyte count and hemoglobin were found to be normal. The total leucocyte count was 15,000. Differential count (made with Goodpasture's stain) revealed:

Small lymphocytes	26
Large lymphocytes	59
Large mononuclears	5
Neutrophils (8 immature forms)	10

No malaria
Urinalysis negative

The diagnosis was acute infectious mononucleosis. Under treatment he improved rapidly and was discharged on July 18, 1932.

OTHER BLOOD DYSCRASIAS

Purpura (essential thrombocytopenic purpura) is mentioned in this discussion, not because of any early throat manifestations, but because of the danger of performing nose and throat operations upon such patients. Epistaxis is a fairly common and early symptom and petechial spots may be noted on the buccal and pharyngeal mucosa, but neither of these is a constant sign.

Some months ago a general surgeon referred a patient to me for examination and gave me the following history concerning her. She was working in another city and consulted a physician, complaining of asthenia. After studying her case that physician advised tonsillectomy. She returned to her home in order to have her family surgeon operate upon her, and gave him a history that the general examination, including blood examination, was negative. Operation was performed and followed by severe hemorrhages. Examination revealed that she had a case of purpura and it was only by the most energetic treatment, including several transfusions, that a fatality was avoided.

In eliciting a patient's history, care should be exercised regarding testimony as to previous spontaneous bleeding from the mucous membranes. In the case mentioned above the patient gave a history of spontaneous hemorrhages from the nose and gums, of bruising easily, of having petechial spots under the skin of her legs, and that the bleeding time was prolonged. The surgeon relied on the patient's report of the physician's examination, with almost a tragic result.

Hemophilia is mentioned for the same reason as purpura. This is a sex-linked, hereditary disease, transmitted by the female but manifested only in the male and characterized by a tendency to prolonged hemorrhage and a definite delay in the coagulation time of the blood.

Furthermore, there is a class of patients who are not true hemophiliacs, but who have a prolonged bleeding time and a definite tendency to hemorrhage. These patients usually have an unbalanced diet and are almost always anemic. The following case report is fairly typical:

Case S6908.—A white school girl, age 14, consulted me on July 16, 1926, complaining of sore throat. She had an acute tonsillitis with the usual concomitant signs and readily responded to treatment. She gave a history of frequent attacks of tonsillitis, fairly frequent head colds and of feeling "pepless." She was anemic in appearance. I advised tonsillectomy. Her father came to my office the following day to tell me that her older brother's tonsils were removed at the age of 6; that the child had a delayed primary hemorrhage so severe that life was endangered; and that he did not care to have a similar occurrence. On examination her bleeding time was found to be 1¼ minutes; her coagulation time was 17 minutes. Calcium preparations, tonics and a heavy milk diet were prescribed, but the patient had an aversion to them and refused to take any of them. Fortunately, she did like citrus fruits and did follow a few other dietary suggestions. On July 11, 1927, her bleeding time was 30 seconds and her coagulation time was 3 minutes. Her tonsils were removed and she recovered without difficulty.

DISCUSSION

These various diseases may be accurately diagnosed only with laboratory aids. No discussion of differential diagnosis or of laboratory findings has been presented, for I feel that all these cases should be referred to an internist, into whose province they rightfully fall.

But how shall we make sure that no such cases slip through our hands unsuspected? Some of us may have had sufficient training promptly to recognize them; others may be sufficiently astute to realize that a general disease is present; but the large majority of us, those who make diagnosis by elimination, must follow a routine that will enable us to cope effectively with all cases which present themselves to our attention. Since these diseases may be diagnosed only by laboratory methods, it naturally follows that we must use the laboratory aids that are at our disposal, and use them routinely. In this way, and in this way only, can we adequately protect our patients, not to mention our own professional reputations. I feel sure there is no one present who, on finding a membranous lesion in a patient's throat, would not take a swab for laboratory examination of smear and culture. It is my humble opinion that in all these cases a differential white blood count should be made. Should any of the leukemias, agranulocytic angina, acute infectious mononucleosis or even aplastic anemia be present, the laboratory report would definitely indicate a blood dyscrasia. Those patients who have a marked pallor should have a total red blood count and hemoglobin estimation made; this would definitely indicate the degree of anemia present. In taking histories the patient should be especially questioned regarding hemorrhages, either spontaneous or following extraction of teeth, *et cetera*. Further, before performing any nasal or throat operation, the patient's bleeding and coagulation time should be taken. Should either, or both, be prolonged, a further study of the case should be made. These simple laboratory procedures, routinely followed, will prevent what might later be considered a colossal blunder.

SUMMARY

(1) Some blood dyscrasias present such marked throat manifestations that otolaryngologists may be consulted before conference is held with an internist.

(2) The symptoms that would suggest such blood dyscrasias are reviewed.

(3) These dyscrasias may be suspected from the results of simple and common laboratory procedures.

(4) In all suspicious cases adequate laboratory examinations should be made.

(5) In all cases, particularly preoperative cases, the history should contain definite information regarding any previous hemorrhages; further, in all preoperative cases the bleeding and coagulation time should be taken.

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DISCUSSION (*Abstract*)

Dr. John J. Shea, Memphis, Tenn.—Hematology is undergoing radical changes. The relationship of the anginas and the hematopoietic system is uncertain, for in one instance an infection of the throat may be the initial lesion, and in another the terminal manifestation of a hematopoietic disease. The medical student of ten years ago was taught a theoretical classification of the diseases of the blood which was not practical when applied in the routine of medicine. Today, one seeks a better knowledge of the possibilities of the hematopoietic response to infection, and this knowledge can best be obtained through a closer study of the observations on the blood in the anginas.

The older physiologists considered the blood as a special form of connective tissue having a fluid matrix. The modern conception is that the blood is a mixed secretion, the formed elements of which are the result of parent cells living outside the blood stream. These hematopoietic tissues differ in the embryo and the adult. The fetal blood is formed as a result of the activities of the blood islets in the yolk sac, the primitive liver and the reticulo-endothelial system. The capillaries of the formative bone marrow, the lymphoid follicles of the spleen and other lymphoid structures next add to this natal blood. The process changes gradually, until in adult life there exist groups of parent cells outside the blood stream, with four major hemic units in the blood. From the parent myeloblasts come the granular cells, which are the polymorphonuclear leucocytes and the monocytes; from the lymphoblasts are derived the lymphocytes, and from the normoblasts, the red blood cells.

The bone marrow houses an emergency supply of polymorphonuclear leucocytes and can deliver them into the circulation when needed. If the surplus is consumed and the newly formed cells are not sufficient for the demand, immature forms will be found in the circulation. The most common causes for the presence of immature cells in the blood are: (a) hemorrhage, (b) diseases that destroy blood cells, (c) various substances that act as stimulants to the hematopoietic system, and (d) hyperplasia of the hematopoietic tissues.

The infections of the throat are characterized by the influence they exert on the hematopoietic system, and belong to the third class. On the other hand, there are primary diseases of the blood that produce lesions in the mouth, and it is difficult to separate the borderline cases.

The laryngologist has an opportunity to study the relationship of the anginas and the hematopoietic response in the following diseases: agranulocytic angina, acute infectious mononucleosis, Vincent's angina with a lymphoid leucocytosis and acute lymphadenosis.

The anginas are capable of producing four types of changes in the blood: (1) polymorphonuclear leucocytosis as seen in follicular tonsillitis and septic throat; (2) mononuclear leucocytosis, which occurs in infectious mononucleosis; (3) leucopenia with a decrease of granulocytes (agranulocytic angina); and (4) leucocytosis with a relative hypogranulocytosis, as seen in the patients suffering from a generalized Vincent infection and an acute lymphatic leukemia. The following figures are illustrative:

BLOOD CHANGES IN THE ANGINAS

Type	White Cells	Polys.	Lymph.	Monocytes
1	+:10,000 to 20,000	+	—	—At first, shift to left +healing, shift to right
2	+:12,000 to 20,000	—	+	+above 6 per cent
3	—: 0 to 3,000	—	+	0 agranulocytic
4	+: 16,000 to 40,000 100,000 up	— —0 to 10%	+ +	0 Generalized Vincent 0 Lymphatic leukemia

CALCIUM AND PHOSPHORUS METABOLISM IN A CASE OF CELIAC DISEASE*

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and
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Recently a case of celiac disease came to the attention of the writers and they are here reporting studies made on the calcium and phosphorus metabolism. The case history and physical findings will be omitted, as the case was rather typical. However, deformity was more marked than in most cases.

General Laboratory Findings.—The Wassermann test was negative, the intradermal tuberculin test negative, white blood cells were 9,300, red blood cells 4,720,000, hemoglobin 88 (Sahli). The differential count showed polymorphonuclears 63, eosinophils 1, and lymphocytes 36. Blood chemistry done on June 14, just as treatment was begun, showed calcium 9.9 mg., phosphorus 6 mg., protein 8.7 gm., non-protein nitrogen 24 mg., and cholesterol 192 mg. per 100 c. c. of blood. The carbon dioxide combining power of the plasma was 50.4. A basal metabolism test proved to be unsatisfactory.

The feces were abnormal in physical appearance and contained fatty acids, but as the experiment went on, they became normal in appearance and odor.

Diet.—The diet during the experimental period was confined to eggs, lean meat, milk, Mead's cereal, potatoes, bread, apples, apple sauce, pears, butter, and fresh orange juice, usually about 250 c. c. of the latter daily. In order to reduce individual variations in the inorganic salt content of the various foods to a minimum, the eggs and milk were always obtained from a constant source. All of the various foods were analyzed for calcium and phosphorus at the beginning of the experiment and these values were used in calculating the calcium and phosphorus intake. The water intake was recorded and the calcium in this was calculated in the intake. The child was fed by a graduate dietitian and medication was administered with the food.

Method of Analysis.—Morris, Nelson and Palmer's (1931) method was followed for the determination of calcium and phosphorus in both foodstuff and feces. The feces were collected in beakers and the total for each period transferred to a weighed evaporating dish, evaporated to dryness, weighed, ground, and samples taken for analysis. The urine specimens for each period were mixed, acidified, diluted to volume, and aliquots taken for calcium and phosphorus analysis. Calcium was determined as the oxalate and phosphorus by the colorimetric method of Fiske and Subbarow (1925).

The chemical analyses were not begun until the child had been on the standard diet four days. The first three periods represent the results on the standard diet with no treatment except ten-minute sun baths morning and evening.

Medication was started in the fourth period. During the fourth and fifth periods 1 c. c. (30 drops) viosterol 250 D* was given daily. In the sixth and seventh periods, viosterol 250 D was increased to 3 c. c. (90 drops) daily and calcium lactate 2 gm. per day were given. In the eighth, ninth and tenth periods, the vitamin D preparation was changed to irradiated ergosterol 1,000 X, which has ten times the vitamin D content of viosterol 250 D. She received 1 c. c. (30 drops) of this daily during these periods and the calcium lactate was increased to 4 grams daily. During the eleventh, twelfth and thirteenth periods, the irradiated ergosterol was reduced to one-third the three previous periods, or 10 drops daily, and 2 gm. calcium phosphate daily were added. The calcium lactate was held at 4 gm. per day. This treatment was continued for a further 17 days, in which there were no analyses. Periods fourteen and fifteen followed this seventeen-day period. The treatment remained the same through these two periods.

The patient's vomiting interfered with the accuracy of the experiment in the early periods. The vomitus was collected, added to the fecal excreta for that period, and analyzed. There was certainly some loss, but this error would have been shown as retention, consequently observed retentions would be slightly in excess

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*Received for publication March 9, 1933.

*The viosterol 250 D and irradiated ergosterol 1,000 X were furnished for this study by Mead Johnson and Company.

of that actually retained. It is our impression that this loss of calcium or phosphorus was very small.

At the time of admission to our service, she spent most of her time lying in her bed, but would sit up at times. By the ninth period she sat up much more and insisted on being out of bed on a chair part of the time. After this time, she began to walk around her chair, and by the end of the thirteenth period she could walk about it five times in succession, this in spite of the fact that she had never walked much before and that one leg was functionally three inches shorter than the other.

X-ray pictures taken at the end of the thirteenth period showed that the progress of the disease had been arrested and perhaps slight improvement made. Films taken four weeks later showed marked improvement at points of spontaneous fractures and osteotomies

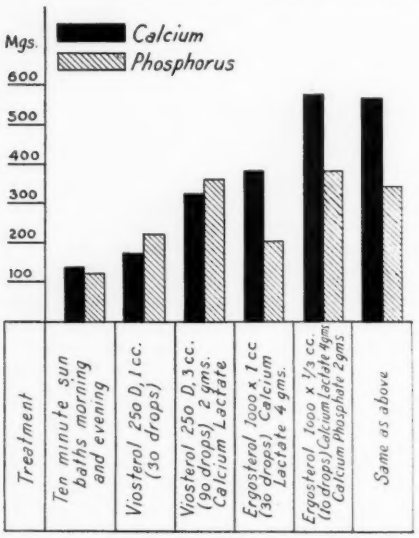

Chart 1

Showing the calcium and phosphorus retention in a case of celiac disease on different amounts of vitamin D and calcium treatments.

with some improvement in deposits of lime salts in the bones of the leg and a definite increase of lime salts in the femur. In this case clinical improvement was noticeable more than a month before the x-ray showed definite repair. Although the case was much improved clinically and calcium and phosphorus retention were good, there was still some element lacking in the treatment, as the child did not begin to grow again and there were still big and sudden fluctuations in weight.

Table 1 gives the calcium and phosphorus intake, excretion through feces and urine, calcium and phosphorus balances, and the medication, and shows that not only was the total daily calcium retention increased with an increase of calcium intake, but that the percentage of retention was increased. This was true in the eleventh, twelfth and thirteenth periods when the vitamin was reduced to one-third of that given in the eighth, ninth, and tenth periods. The findings here agree in principal with those of Sherman and Hawley (1922) who, working on a normal child, found that while calcium intakes of 0.4 gm. per day regularly resulted in some retention of this element, feeding of from 0.9 to 1.2 gm. per day was necessary in order to induce optimum calcium retention. This case required still higher calcium intake than the above. In respect to healing, the results differ with those of Jampolis and Londe (1932). In their cases of osteomalacic-like rickets healing was shown by x-rays only after large doses of vitamin D and after several months on good vitamin medication. Here clinical improvement was noticeable in less than a month and x-ray films showed the disease arrested in six weeks. In their cases no reference is made to the calcium content of their diet. Bloom (1932) reports 31 cases of rickets treated by the substitution of secondary calcium phosphate in place of cod liver oil or vitamin D in the children's diet.

The absence of satisfactory calcification when the calcium was 9.9 mg. and the phosphorus 6 mg. per 100 c. c. of blood is difficult to explain, but it is likely that one of the factors was the high serum protein. Hastings, Murray and Sendroy (1927) and Peters and Eiserson (1929) have calculated that under average conditions each gram of protein combines with 0.556 mg. of calcium. This would mean that in our patient, assuming average conditions, 8.7 x 0.556 = 4.8 mg. of calcium was in combination with the proteins, while if the protein concentration was 7 per cent only 3.9 mg. of calcium would be thus bound. It is likely that protein bound calcium does not take any direct part in calcification, consequently if other factors are equal, a higher product for calcium and phosphorus is necessary for calcification when the serum protein is high than when it is normal.*

The question has been raised in this case as to the probability of an endocrine element in the production of the poor calcification. A parathyroid tumor must be considered, but hyperparathyroidism produces a high blood calcium with a lowering of the blood phosphorus as shown by Albright *et al* (1929). This case showed a low normal blood calcium and normal blood phosphorus. Hypoparathyroidism produces a low blood calcium with tetany if the deficiency is severe. Neither was true. The thyroid gland was normal so far as could be detected by physical examination.

A lowered secretion of the anterior lobe of the hypophysis in children sometimes produces a faulty bone metabolism and retards growth. An x-ray of the sella turcica showed it much smaller than normal. According to Bandler (1920) signs of hypopituitarism include abnormal bone metabolism and slow growth, dry skin, tendency to subnormal temperature, low blood pressure, slow pulse, polyuria, psychosis and adipos-

*Parsons, *American Journal Diseases of Children*, May, 1932, has a very complete bibliography on celiac disease and discusses it from all angles.

Table 1

Showing the treatment, intake, excretion in urine and feces, and retention of calcium and phosphorus on a daily basis, together with the average daily retention in grams and daily per cent retention per treatment period.

Period	Duration, Days	Treatment	Calcium in Grams				Phosphorus in Grams				Average for Treatment Period: Daily Retention		Per Cent Retention	
			Intake	Output Urine	Output Feces	Retention	Intake	Output Urine	Output Feces	Retention	Calcium Grams	Phosphorus Grams	Calcium	Phosphorus
1	7	Standard diet	0.83	0.16	0.58	0.09	0.92	0.60	0.27	0.05				
2	3	Ten minutes sun baths morning and evening	0.75	0.12	0.55	0.08	0.82	0.47	0.29	0.06	0.13	0.12	16.00	13.4
3	4		0.87	0.11	0.52	0.24	0.91	0.52	0.10	0.29				
4	4	Above plus viosterol 250 D 1 c. c. (30 drops)	0.94	0.10	0.73	0.11	1.04	0.50	0.30	0.24				
5	4		0.92	0.09	0.60	0.23	0.93	0.49	0.25	0.19	0.17	0.22	18.3	21.1
6	4	Same diet. Viosterol 250 D, 3 c. c. (90 drops)	1.21	0.10	0.73	0.38	1.00	0.33	0.23	0.44				
7	4	2 gms. calcium lactate	1.23	0.11	0.85	0.27	1.04	0.43	0.34	0.27	0.32	0.35	26.7	34.8
8	4	Same diet. Ergosterol 1,000 X, 1 c. c. (30 drops),	1.27	0.11	0.75	0.41	0.82	0.34	0.27	0.21				
9	4	calcium lactate 4 gm.	1.24	0.10	0.83	0.31	0.69	0.28	0.25	0.16	0.38	0.20	31.00	27.1
10	4		1.19	0.12	0.66	0.41	0.74	0.33	0.17	0.24				
11	4	Same diet. Ergosterol 1,000 X, 1/3 c. c. (10	1.67	0.11	0.87	0.68	1.01	0.41	0.28	0.32				
12	4	drops), calcium lactate 4 gm., calcium phosphate	1.76	0.13	1.24	0.39	1.13	0.44	0.40	0.29	0.58	0.38	33.6	33.5
13	4	2 gm.	1.75	0.13	0.95	0.67	1.20	0.37	0.31	0.52				
14	4	Same as above	1.79	0.12	1.17	0.50	1.22	0.53	0.37	0.32				
15	4		1.79	0.09	1.05	0.65	1.18	0.46	0.36	0.36	0.57	0.34	32.1	28.3

ity. Except for the poor bone metabolism and the slow growth, not one of these signs was present. The lack of growth and the bone metabolism may be explained by an insufficient amount of calcium in the food. Osborne and Mendel (1918) showed that young rats subjected to drastic deprivation of calcium intake ceased to grow in a short time. This child, through aversion to milk and frequent vomiting of that which she took, certainly made her calcium intake very low.

Since there is much interdependence between the glands of internal secretion, it becomes difficult to rule them out in a case like this, and as a proper calcium intake over a period of several months since these studies were made did not stimulate growth, the cause of the troublt must be sought for in the glands of internal secretion.

SUMMARY

A case is reported of celiac disease continuing for eight years in which liberal doses of vitamin D and a substantial increase in the calcium intake changed very poor positive calcium and phosphorus balances to strongly positive balances and produced marked clinical improvement after one month's treatment. The calcium retention was not only increased with the increased calcium intake, but the percentage retention was also increased. X-ray pictures taken three weeks after good retention showed little improvement, but those repeated four weeks later showed heavier shadows throughout the long bones, healing of some fractures and progress toward healing of other spontaneous fractures ununited for several years. There was no improvement in growth and some other factor must be sought as the cause of the underdevelopment.

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ROENTGEN RAY TREATMENT OF TUBERCULOUS CERVICAL LYMPH NODES*

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Roentgen discovered the "X," or unknown rays, at Wurzberg in 1895. The active or chemical powers of the rays were first recognized through the destructive burns received by the numerous new experimenters. The burns at once suggested the possibility of a new agent for the destruction of morbid tissues, notably those of the skin, including tuberculosis.

In 1902, Dawson Turner, medical head of the electrical department of the Royal Infirmary, Edinburgh, published the third edition of his "Manual of Practical Medical Electricity." On page 376, under the subheading, "Enlarged Tubercular Glands," he writes:

"Six cases of enlarged tubercular glands have been under roentgen ray treatment in the Electrical Department of the Royal Infirmary. The exposures have been of five minutes' duration, three times a week. The duration of the disease has varied from thirteen years to three months. In some of the older cases, many operations had been performed and sinuses were present. The glands affected were cervical in five cases and axillary in one. In all these cases, marked improvement has been brought about, and in two of them a complete cure (duration of these latter, eighteen months and seven months). I am not aware of any other recorded cases of this treatment of this disease, and credit of the initiation of this treatment lies with Dr. Hope Fowler, the Assistant Electrician of the Royal Infirmary."

This places the first recorded use of the roentgen ray in glandular tuberculosis about the year 1900.

In 1902, F. H. Williams, of the Boston City Hospital, in his book, reported that even the largest lymph nodes responded surprisingly well to treatment with the roentgen ray.

*Read in Section on Radiology, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

*From the Department of Medicine, Duke University School of Medicine.

OTHER THERAPEUTIC AGENTS THAN THE ROENTGEN RAY

It became evident from the first that treatment could not conscientiously be limited to the roentgen ray alone. Therefore, in a majority of our patients, some of the following additional measures were used:

Attempts were made to improve the general hygiene.

All foci harboring simple and tuberculous infection, such as tonsils and adenoids, were treated.

Rest was prescribed as needed, sometimes rest in bed.

Cod liver oil and "tonics" were prescribed as appeared helpful.

Surgical dressings were applied to wounds and sinus tracts.

Minor surgical operations, such as aspiration, incision, curettage, and small biopsy, were performed.

Major operations were performed, that is, attempts were made to excise a lesion or a group of lesions.

The patient was treated for tuberculosis elsewhere in the body, but those showing pulmonary tuberculosis were not included in our series of 141 patients.

Other ailments, such as constipation or other non-tuberculous diseases, were treated.

Patients were urged to seek, and sometimes arrangements were made to provide, sunshine, fresh air, good food, better environment and rest. Specialists were employed to examine and to treat the nose, throat, ear, skin, mouth, eye, and chest. Small doses of cod liver oil were used over long periods in almost every case.

OPERATIONS

It might be argued that the operations alone favorably changed the course of the disease: that they, not the roentgen ray, were the main feature of the treatment; that particularly the major operations in certain cases brought about the result. Sixty-nine of our 141 patients submitted at some time to some form of operation.

Aspiration of one cystic swelling plus 12 roentgen ray treatments were associated with complete resolution.

Our experience has shown that aspiration alone has little or no therapeutic value in cystic or in fluctuating tuberculous lesions in the neck.

The operation of incision with or without cu-

rettage of sinuses or abscesses was performed 43 times. Most of these were simple incisions, of which 15 were performed within a month before the roentgen ray treatment was started, and 28 during the treatment or soon after it ended. The 15 patients in whom incisions were made before treatment had reached, at the start of their treatment, the sinus stage of the disease. In 19 of the 28 patients in whom incisions were made after treatment had been begun, the softening appeared to have been induced by the roentgen ray. There were two in whom the lesions softened under roentgen ray treatment without incision; so it is interesting to note that 21 of the 141 patients appeared to suffer "cold" abscess formation as a result of the roentgen ray exposures. Incision of cold abscesses is generally admitted to be inadequate treatment. They keep on draining.

ROENTGEN RAY DOSAGE AND TECHNIC

The roentgen ray dosage which held good for all but a very few cases was about one-third of the dose of filtered roentgen ray necessary to produce a slight erythema in an average person. Occasionally, larger doses were given over cold abscesses to bring about more complete caseation.

The patients received appointment cards with two weeks fixed as the interval between treatments. The number of treatments advised was not fixed at first, but was gradually increased up to ten, which was finally chosen as the minimum number of treatments for all patients. Such a series lasted about four and one-half months. More treatments were then given to some patients who were not markedly improved by the end of the series.

The smaller doses of roentgen ray were selected for this work because of the extreme susceptibility of the lymphoid cell to the roentgen ray; because of the disadvantage of massive destruction of these cells which almost certainly play an active part in resistance to the disease; because of the probably stimulating effect of small doses on the production of lymphoid cells; because at the time we began fewer reports had been published on the results of small doses than of large doses; because they are safer and can be given oftener, thus allowing the physician to observe the patients more closely; because our aim was to induce resolution without softening (softening appeared more likely to occur with the larger doses); and because it was thought the reactions from the larger doses were more likely to interfere with appetite, nutrition, and general health.

TREATMENT

Since in many cases of various types the disease apparently disappears or there is great improvement for varying periods without treatment, evidence in favor of a method of treatment must include these points:

(1) The patient must show definite improvement within a reasonable length of time. In other words, there must be a significant time ratio between the duration of the disease before treatment and the appearance of definite improvement after the beginning of treatment.

(2) The longer the follow-up period, the more conclusive is the evidence concerning the durability of the improvement.

(3) A given method of treatment must be compared with the natural course of the disease and with other methods of treatment.

The disease does not disappear spontaneously in all cases; sometimes it persists for years. However, significant data on a large untreated group are not available for comparison. Many factors influence resistance and resolution, such as the general condition and age of the patient, pulmonary tuberculosis, the extent of the disease in the neck and the virulence of the infection. These factors vary considerably in different parts of the world.

CONCLUSION

(1) Small doses of filtered roentgen ray given at intervals of less than three weeks appear to shorten the course of the disease and to favor resolution or marked improvement in all stages (except cold abscesses) in a sufficiently large percentage of cases to justify the conclusion that the roentgen ray is useful in the treatment of tuberculous glands of the neck. The usefulness of roentgen ray treatment compares favorably with that of other single methods of conservative treatment.

(2) A definite superiority of small doses of filtered roentgen ray over other single forms of conservative treatment cannot be proven, but is supported by these observations. (Natural heliotherapy at selected sites may be superior, but should not exclude roentgen ray therapy.)

(3) This form of roentgen ray treatment apparently does not cause undesirable effects not easily avoided.

(4) Small doses of the roentgen ray are inferior to the radical surgical treatment as reported by Dowd. However, his patients in whom radical operation was strikingly successful belonged to a selected group composed largely of children,

most of whom were operated upon in the early stage of the disease. Hence, even radical surgery might give little better results than the roentgen ray in such an unselected group as this, in which most of the patients were older and were in advanced stages of the disease.

(5) From a study of the lesions we found that: the best results appeared in the treatment of patients who had tuberculous sinuses, of whom 76.8 per cent apparently were cured. Eight months after the first treatment was the fair average time for the attainment of apparent cure. The sinuses, however, received the largest number of treatments.

TUBERCULOSIS IN A RURAL AREA*

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and
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Tuberculosis as one of our major health problems, since early history, has been described from many viewpoints. The progress made in diagnosis, particularly of childhood forms, and in the knowledge of the wide distribution of the disease, has been rapid during recent years. The epidemiology of tuberculosis, in the light of our present knowledge, has been pictured as a submerged mountain range with volcanic peaks projecting above the surface, in which we have investigated the peaks, with the major share of excavations and investigations of bed rock still before us.

Most of us are faced with attacking the problem in some concrete form, utilizing all accepted landmarks and guides in the knowledge of the disease to direct our efforts on a sane and rational basis. Our area of jurisdiction is somewhat circumscribed as a state, county or municipality. In this paper the area selected is Lee County, Alabama. Certain facts which have been noted over a six-year period by the County Health Department may be applicable to similar areas.

The Lee County Health Department was organized in the late fall of 1925 with a personnel of four. On July 1, 1930, the Training Station was transferred to Opelika with a reorganization and an increase of the staff to eight members. This was made possible through a grant from the Rockefeller Foundation. An epidemiological study was to be undertaken and in May, 1932, the set-up was reorganized for the study of tuberculosis. The present staff is headed by:

(1) A director who is also county health officer and epidemiologist for the project
(2) Assistant county health officer
(3) Public health nurse
(4) Sanitary inspector
(5) Secretary
(6) One full-time and one part-time veterinarian
(7) Tuberculosis clinician
(8) Tuberculosis clinical nurse
(9) Tuberculosis field nurse
(10) Laboratory technician and secretary

The advantage of this type of organization is that it gives the opportunity to carry on field work in public health and a research program as a joint project.

The traveling diagnostic chest clinics of the State Board of Health were made available to Lee County in November, 1930. They held three clinics, each of four days' duration, from November, 1930, until November, 1931.

Lee County, Alabama, is fairly typical of the average Alabama county. It has an area of 629 square miles, rather rolling in topography with the highest elevation 820 feet and the lowest 250 feet. Climate is that of the warm temperate zone with an average annual temperature of 67.6. Average annual precipitation is 48.5 inches.

Agriculture is the chief occupation, with moderate industrial development in two of the larger municipalities, Opelika (6,156) and Phenix City (6,599). Cotton mills predominate with employes and dependents approximately 7,000.

Population has increased over the ten-year period, 1920-1930, with the main increase in municipal groups and a slight decrease in the rural sections.

	1930		1920	
Color	Number	Per Cent	Number	Per Cent
White	17,457	48.3	14,037	42.8
Black	18,685	51.7	18,784	57.2
Total	36,142		32,821	

Improvement in roads, bus transportation, *et cetera*, assure accessibility to all groups of the population. There are no isolated sections within the county.

The tax value of Lee County is $11,000,000, with a per capita appropriation for health of 15 cents in 1926, increasing to 20 cents in 1930.

*Read in Section on Public Health, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

The medical profession of Lee County has 21 members. They are above the average in ability and have, without exception, cooperated intelligently and whole-heartedly in the general health program.

One small hospital of 20 beds is situated in Opelika and a competent radiologist with adequate equipment is attached to this institution. There are no institutional facilities for the care of tuberculous patients in the County and there is no state sanitorium for tuberculosis.

Lee County is provided with all the so-called cooperative agencies: farm and home demonstration agents, white and colored child welfare and active organizations for all purposes, parent-teacher associations, civic clubs, community chest, Red Cross, crippled children, *et cetera*. The support given to health work in general has been excellent and appropriations have increased rather than decreased.

We feel that Lee County represents an ideal territory, with a cooperative citizen group, an intelligent and sympathetic medical organization and a health department since 1925 which has carried on an active and balanced health program.

The vital question which one might ask and one which we have asked ourselves, and will try to answer, is, "What have you done in tuberculosis prevention and control?" Let us look at a few of the facts as they present themselves for consideration.

MORTALITY

Year	White No.	White Rate	Colored No.	Colored Rate	Total	Co. Rate	State Rate
1923	9	64.1	22	117.1	31	94.4	98.2
1924	8	57.0	18	95.8	26	79.2	96.2
1925	7	49.9	34	181.0	41	124.9	99.2
1926	8	57.0	32	117.1	30	91.4	93.7
1927	7	49.9	23	122.5	30	91.4	86.5
1928	8	47.1	21	116.7	29	82.8	89.6
1929	4	23.1	21	113.4	25	69.8	85.7
1930	10	57.3	19	101.7	29	80.2	86.0
1931	8	35.8	20	107.0	28	77.5	85.7

The tuberculosis death rate has dropped from 150 to 70.7 in the United States and that of the Southern Conference area from 140 to 80.4. While the numbers in Lee County are too small to be of statistical significance, the trend follows our State rate. Tuberculosis ranked sixth as the cause of death in Lee County in 1930 and seventh in 1931.

Our records indicate that 78.1 per cent of colored deaths occur under the age of forty years and 64.5 per cent of white deaths over the age of forty years. The absence of a death under fifteen years of age in the white group is unusual.

TUBERCULOSIS DEATHS BY COLOR AND AGE GROUPS IN PERIOD 1926-1931

Age Group	W M	W F	C M	C F
0 to 4	—	—	6	—
5 to 9	—	—	1	—
10 to 14	—	—	1	2
15 to 19	1	1	4	9
20 to 29	1	7	16	40
30 to 39	3	3	7	21
40 to 49	3	5	4	8
50 to 59	2	3	7	7
60 to 69	4	5	4	—
70	4	3	—	—
	18	27	50	87
Total	45		137	

MEDICAL SERVICE IN RELATION TO TUBERCULOSIS DEATHS

Period of Observation and Treatment	1928 W	1928 C	1931 W	1931 C
Less than 1 week	1	7	1	5
1 week to 1 month	2	5	3	3
1 month to 3 months	1	2	—	6
3 months to 6 months	2	2	2	1
6 months and over	2	3	1	2
No medical attendance		2		4
Total	29		28	

Two years were selected because of the same approximate numbers of deaths and the period before and after inauguration of the training station and increased personnel. The significant point is the large percentage of persons who come under observation for a period less than one month or who have received no medical attendance: colored, 66.6 per cent for 1928 and 57.1 per cent for 1931.

SERVICE OF HEALTH DEPARTMENT TO A GROUP OF PATIENTS WHO DIED OVER A SIX-YEAR PERIOD

Period of Service	1926 W	1926 C	1927 W	1927 C	1928 W	1928 C	1929 W	1929 C	1930 W	1930 C	1931 W	1931 C	Total	Per Ct.
Under 1 m.	..	2	1	3	..	1	..	2	2	2	3	4	20	26.3
1 to 6 m.	..	3	1	1	..	6	2	2	1	5	1	4	26	34.2
6 to 12 m.	1	..	..	2	2	4	1	2	..	..	2	1	15	19.8
1 to 3 yrs.	1	..	1	1	..	2	2	1	1	2	..	3	14	18.4
3 years and over	..	..	..	..	..	..	..	..	..	..	1	..	1	1.3

In order that the Health Department may initiate educational and protective measures in tuberculous homes it is of extreme importance that an early entry to the home be made. When 60.5 per cent of these fatal cases die in less than six months it is difficult to accomplish one's objectives.

The correlation between the medical services in fatal cases and the Health Department's educational program emphasizes the difficulty which has existed in seeing a case sufficiently

early to have any reasonable opportunity for either treatment or prophylaxis.

MORBIDITY RECORD OF TUBERCULOSIS AS RECORDED FROM OUR WEEKLY COMMUNICABLE DISEASE REPORTS

	1926	1927	1928	1929	1930	1931
White male	1	2	1	1	2	10
White female	2	3	....	....	9	5
Colored male	4	6	4	....	4	8
Colored female	5	4	10	3	6	5
Total	12	15	15	4	21	28

The reporting of our ordinary communicable diseases, with the exception of venereal disease and tuberculosis, is excellent. The weekly report card coming openly through the mails is returned regularly by the majority of physicians on the weekly schedule. With the exception of 1931 the cases of tuberculosis reported in this manner have not equaled the number of deaths. The physicians do object to notification, particularly of white tuberculous patients, in this manner and prefer telephone or personal communication.

TUBERCULOSIS ROSTER OF LEE COUNTY, WITH REPORTS FROM ALL SOURCES 1926-1931

Year—Race	Before Death	After Death	Susps. Positive	Susps. Negative	Sputum Positive	Sputum Negative	No. Spm. Exam.	Moved from County
1926—White	21	7	3	8	4	14	10	7
Colored	11	5	—	1	2	8	8	5
1927—White	12	3	3	2	3	2	10	2
Colored	13	10	1	4	2	1	19	2
1928—White	15	6	2	3	2	5	12	1
Colored	18	18	....	3	7	4	25	7
1929—White	19	4	—	1	6	6	11	8
Colored	6	7	....	....	6	1	6	1
1930—White	30	3	2	7	8	14	11	1
Colored	17	7	—	2	12	5	8	2
1931—White	61	8	2	3	14	30	28	7
Colored	48	16	....	7	15	20	29	2
Total	271	94	13	41	81	110	167	45

Under column "Before Death" are those patients who were reported or discovered and visited as living cases. Under the column "After Death" are those who were reported so close to or after death or by death certificate that the families were visited after the death of the case. Of the families under supervision, 25.8 per cent were investigated after the death of the case. Fifteen and one-tenth per cent of cases reported were proven to be non-tuberculous. Twenty-two and two-tenths per cent of cases were sputum positive; 30.1 per cent were sputum negative, and 45.8 per cent were not given sputum examination.

The Alabama State Laboratories in 1930 examined 8,531 specimens of sputum with 1,537, or 18.0 per cent, positive. Of our specimens submitted over a six-year period, 22.7 per cent were positive. Our average of approximately one sputum examination per patient indicates that the laboratory facilities are not being utilized.

UTILIZATION OF LABORATORY FACILITIES FOR SPUTUM EXAMINATION

Year	Positive		Negative		Total
	W	C	W	C	
1926	4	2	16	10	32
1927	1	2	21	11	35
1928	3	7	15	13	38
1929	5	6	11	7	29
1930	2	15	29	26	72
1931	19	16	65	55	155
Total	34	48	157	122	361

To date, of 94 sputum positive cases on record in Lee County, 30 white and 10 colored are living, with 14 white and 40 colored dead.

If the number of sputum examinations is any indication of the effectiveness of our control measures, we have certainly failed.

The State diagnostic chest clinics were sent to Lee County for a period of twelve days, from November, 1930, to November, 1931. Our objective was to classify the accumulated unknowns on our records, and known positive cases were excluded. There were 193 persons examined at these clinics. In preparation for one clinic all available contacts of our dead cases were tested with 0.1 mg. of old tuberculin on a house-to-house schedule. This survey required two weeks, and of the positive reactors 73 were selected for examination and x-ray. Thirteen were positive cases, 10 suspicious and 50 negative. In addition, 41 persons carried on our roster were diagnosed negative.

The State diagnostic clinic has been responsible for reducing our case load to the point where it was possible for the Health Department to consider a reasonable field visiting schedule compatible with a balanced program.

Our general program on tuberculosis control previous to the assistance of our State diagnostic clinic might properly be termed a "nursing program." In all, approximately 4,000 field visits have been made over a six-year period. Administration of the field visiting program by the County Health Officer was a negligible quantity until the case load had been reduced through proper classification of accumulated records.

IMPRESSIONS OVER A SIX-YEAR PERIOD

Population Groups.—The prominent and better class of white families with few exceptions have not come to our attention. Our white cases

are in the working group and mostly confined to municipalities or their immediate vicinity. The majority of our negro cases are in the rural districts and are of the tenant farmer class. The colored cases in the municipalities are from fairly good families who have lived in town over a period of years.

Economic Status.—Approximately 5 per cent of all cases are in a position to pay a physician for a complete examination and services and, if necessary, for examination of the remaining members of the family. About 40 per cent are able to pay for medical services for the patient over a reasonable period of time, but not for examination of contacts. Not more than 40 per cent can arrange to pay for more than one or two visits and medicine if necessary. Approximately 15 per cent are absolutely indigent.

DIFFICULTIES EXPERIENCED BY PRACTICING PHYSICIANS IN THE DIAGNOSIS OF TUBERCULOSIS

The majority of persons with moderately or far advanced tuberculosis present a minimum amount of difficulty, except that confirmation by x-ray or positive sputum is necessary previous to an absolute decision in many cases. In reporting white cases, in particular, to the Health Department this confirmation of diagnosis or its absence is apparently responsible for delayed reports or no reports.

The childhood type, latent adult disease, or minimal disease is difficult or impossible for the physician to diagnose on physical examination and consequently is rarely reported.

The time at the disposal of physicians in general practice is somewhat limited and unless symptoms are referable to the chest, no examination is made of it. Recently 5 patients were referred to the radiologist at our local hospital, two for possible rib injuries in automobile accidents, two for possible gallbladder series, and one for a probable syphilitic gumma over the lower ribs. All 5 showed chronic fibroid tuberculosis, 3 with cavitation, on x-ray. All were white patients and none had been reported to us.

THE ATTITUDE OF PHYSICIANS ON THE TREATMENT OF TUBERCULOSIS

Realizing that the majority of cases of tuberculosis coming into their practice are far advanced, indigent or semi-indigent, and that death is the most usual prospect, they are not anxious to treat tuberculosis. Such cases do not bring prestige to the attending physician even though he has done all that is humanly possible in a short period of time. In the absence of institutional facilities where surgical procedures could be used in selected cases, and where cases are too far advanced for rest to be a possible factor in recovery, they appreciate the fact that a physician may do very little with the use of medicine except possibly to relieve the final suffering.

The physicians of Lee County have gone on record as opposed to the entry of the public health organization into the field of treatment, and have agreed to care for all cases referred to them: in particular, for childhood types, latent adult types and minimal cases and, in general, for all cases of tuberculosis. They believe that clinicians or specialists in tuberculosis should render a concise recommendation along with a description of the case. They need general forms to be used as a guide in the various types of cases and instructions for the general care of the patient and contacts within the household.

THE RELATION OF THE PHYSICIAN AND THE HEALTH ORGANIZATION

Physicians realize their inability to cope with the problem unless they can assist the health department with a definite scheme of teamwork. Diagnostic facilities, either state or subsidized locally, with x-ray equipment operated by a competent man, in connection with the health department, are the main connecting links between cure and prevention. The use of tuberculin for diagnosis, whether by physician or health officer, must be supplemented. The physician feels that if he provides treatment and physical examinations, the health department can and should care for the epidemiological family studies, tuberculin, x-ray equipment and supplies, or arrange for subsidizing local equipment for all charity tuberculosis work.

Even with a cooperative, intelligent and capable medical profession anxious for leadership and assistance in tuberculosis prevention, the Lee County Health Department does not feel that progress was made prior to the advent of diagnostic facilities in the form of the State Clinic.

The average health organization could well utilize the State Clinic for the purpose of classifying the accumulated case load and so reduce it that sufficient time would be available to care for at least the acute, manifest, sputum positive cases and their contacts. The families of all dead cases, a source from which possibly the majority of our cases of tomorrow will arise, could and should be worked out with a tuberculin

survey prior to a clinic. A diagnostic clinic is of real value to any health organization, but the organization must be properly prepared in order to receive the full value of the service.

THE LEE COUNTY TUBERCULOSIS RESEARCH CLINIC

This project, financed by the Rockefeller Foundation and State, was begun May 1, 1932. The staff, as previously noted, was reorganized January 1, 1932. In preparation for this study, members of the staff devoting their full time to the tuberculosis project received additional training.

Briefly the purpose of the study is as follows:

(1) To determine the incidence of all manifestations of tuberculous infection under conditions that exist in a rural community and their potential significance in relation to clinically manifest tuberculosis.

(2) To determine how the disease spreads in a rural community and the factors that modify its transmission.

(3) On the basis of the information obtained to devise preventive measures adapted to local conditions.

The general plan of procedure which will be used is:

(1) The family or household is the unit of study and all families in which there now exists, or where at some time a member has suffered with tuberculosis, will be the nucleus for the study of the disease.

(2) The search for new cases will be conducted on a county-wide basis, using all available means.

(3) A complete tuberculin survey will be undertaken to include (a) all school children, white and colored; (b) adults and preschool children by precincts or beats; (3) municipal groups; (d) industrial groups. This should indicate the difference in the incidence of infection in town and rural areas.

(4) In areas selected, on the result of tuberculin tests, an epidemiological survey will be made of the families within the areas, with follow-up x-ray examination of selected positive reactors.

(5) The clinic is mobile and equipped with portable x-ray. Seven convenient points within the County, where electric current is accessible, have been selected as clinic centers. Provision is always made in preparation of schedules to render prompt service in all cases referred by physicians. Each physician is provided with cards and stamped envelopes to facilitate immediate reporting of cases.

(6) A fully equipped laboratory is set up in the central clinic at Opelika. The value of frequent sputum examination is stressed to physicians and patients. A minimum series of 10 negative sputums or 2 successive positives is our strict policy. All positive sputum cases are required to submit bi-monthly specimens. Specimen containers are stamped, six being given on the first visit, and are submitted by the patient on a prearranged schedule.

(7) All families in which manifest tuberculosis exists are recorded individually, by family, and the findings for each family kept up to date on a family graph.

(8) General educational measures are carried on by the clinic and county health staff in a joint effort. Each manifest case is under the care of the physician whom he chooses.

(9) When a sufficiently large group of manifest tuberculosis, sputum positive cases are discovered (over the age of eighteen years), the preventive phase of the program will be initiated. This will consist of a division of these families into a study and control series. The only variant in procedure with the two groups will be the initiation of isolation of cases in the study group, using the portable screened cottage, separate screened porches and separate rooms where possible. All cases and contacts will be re-examined and serially x-rayed at intervals.

(10) The administrative problem of rural tuberculosis control will be studied in this County where hospitalization is not available.

DISCUSSION (*Abstract*)

Dr. William A. Claxton, Jacksonville, Fla.—Lee County is very fortunate to have facilities for initiating and developing such an intensive program as has been outlined by Dr. Graham. The plan outlined includes all the measures necessary to make it a success.

Its real success will depend upon the cooperation that can be obtained from the physicians and the public. The physician must be shown that the work will be of definite aid to him and the patient, that his work as a practicing physician will not be interfered with and that the results will justify the extra labor that he must supply as well as the expenditure of public funds.

Dr. Graham has collected valuable data and has prepared the ground for a practical tuberculosis control program. It has been my experience that parents will permit tuberculin tests to be done on their children even more readily than they respond to the idea of the Schick test. If we talk to the high school pupils and explain the details and significance of the test nearly all of them can be influenced to take it. I

think it will be found most satisfactory to take x-rays of all the positive reactors, since parents of positive reactors are inclined to worry until a diagnosis of activity or an inactive infection is established. It is very confusing for the local physician to have to answer the inquiries of perplexed parents.

The services of a chest clinic are very important both for diagnosing moderately early cases and for separating non-tuberculous from tuberculous chest conditions. This is a most important aid to the practicing physician.

The discovery of the early case and putting it under medical control are most important for the whole community.

Dr. Graham (closing).—Lee County, Alabama, I believe represents a good, average, rural county. If a study of these facts and tabulations should result in a critical analysis of tuberculosis records by health officers in their own counties, this review would be of value in formulating future activities.

We have had the opportunity of studying the program before and after diagnostic clinic service was available. I believe that such a diagnostic clinic is the key of successful analysis and initiation of proper control procedures, if the material or persons selected for examination are chosen after careful investigation and tuberculin testing by families.

The close cooperation of the local medical profession is essential and I would suggest the possibility of offering the physicians in a community the opportunity for a personal examination and x-ray by a competent clinician.

X-RAY THERAPY OF PERTUSSIS*

By LUDO VON MEYSENBUG, A.B., M.D.,†
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There is perhaps no pronouncement that strikes greater terror in the heart of the mother than does the diagnosis of whooping cough in her child. The prospect of nursing her baby through weeks or months of violent paroxysms of the most severe cough known, with incessant vomiting, alarming cyanosis, loss of weight, loss of sleep for the entire household and the constant menace of dangerous complications such as bronchopneumonia, is one to take all the joy out of any mother's life. And so it is that, as with the hay fever sufferer, we are ready and anxious to grasp at anything that holds out hope of relief for our afflicted little ones.

The description of pertussis as a clinical entity dates back to 1578, when Baillon, a French clinician, wrote a treatise during an epidemic of the disease in Paris. Through the march of some 350 years vain attempts have been made to control the distressing symptoms of this dreaded malady. We have run the gamut of drugs, inhalations, ether injections, ether and oil per rectum, vaccines, serums, ultraviolet rays and the like until, quite by accident, exposure to roentgen rays was found to exert beneficial effects.

It would serve no useful purpose to dwell on the symptomatology and pathology of pertussis, as these are familiar to you all. I want to remind you of and to emphasize only one feature of the disease, and that is the constant tracheobronchial lymphadenopathy resulting from the invasion of the tracheal mucosa by the bacillus of Bordet and Gengou. If you will bear this fact in mind you will, I think, concur with me in the rationale of roentgen ray therapy. Neither is it the purpose of this paper to speak of other methods of treatment, nor does time permit it.

We must go back as far as 1907 to find our first record of the treatment of pertussis by x-ray, emanating from Russian sources. The second report was made in 1909. Both are lost in obscurity and attracted no attention. The real impetus came when Bowditch and Leonard[1] issued their preliminary report on 26 cases in 1923, followed a year later by a study of 300 cases.[2] In this latter series the patients ranged in ages from a few weeks to fifty years. Their original technic was adhered to, consisting of the following dosage: 5 minutes' duration, tube set at 4 ma., 1 mm. aluminum filter and a 6 to 7 inch back up spark at a distance of 28 inches. The first treatment was given over the anterior aspect of the chest, the second over the back of the chest, and so alternating for 4 exposures at intervals of 2 to 3 days. The total dosage was well within safety limits, the four exposures totaling less than half an erythema dose. The sequence of events after the treatments is interesting. About eight hours after the first treatment the patient felt relief, the symptoms were reduced in severity and duration. After twenty-four hours symptoms reverted to the former degree. The second treatment caused further relief. The most marked changes occurred after the third treatment. Severity of the paroxsyms was reduced, the whoop almost entirely disappeared and cyanosis and vomiting ceased. Those cases treated early in the disease showed the best response, as did the younger patients.

In an intensive study of 20 uncomplicated cases, Bowditch, Leonard and Smith[3] report the effect of x-rays on the number of paroxysms of coughing. On the day of admission these 20 cases had a total of 288 severe paroxysms. On the fifth day after treatment was started there were 157 paroxysms, by the tenth day 96, and at the end of two weeks 43 paroxysms. They found the blood picture to parallel roughly the clinical improvement.

From Kingston and Faber[4] we have a study of 24 cases ranging in ages from seven months to thirteen

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*Read in Section on Pediatrics, Southern Medical Association, Twenty-Sixth Annual Meeting, Birmingham, Alabama, November 15-18, 1932.

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years. Their technic differed from that of the Boston investigators in that their exposures were given at weekly intervals, ¼ erythema total dose with changes in the details of the exposures. Four cases showed marked improvement after the first exposure, 10 were better after the second, vomiting and paroxysms ceasing. Two patients were no better after 3 treatments, which was the maximum number given to the series; the remaining 8 showed gradual improvement, but were not considered cured. These authors remark on the prompt cessation of vomiting as being the most constant effect noted. They also noted an absence of residual cough in the treated cases. In the whole group of 24 cases there were from 445 to 489 paroxysms occurring daily before treatment; after the first treatment from 218 to 245; after the second, 65 to 74 and after the third, 9 to 10, certainly a striking reduction in the number.

Struthers,[5] of Montreal, treated the majority of his 45 cases with one large single exposure, but he does not state the dose or duration. He emphasizes that the larger the dose the greater is the improvement, and the earlier in the paroxysmal stage the treatment is given the greater is the probability of relief. In his cases treated after the third paroxysmal week he noted slight or no improvement. It is the writer's belief that his technic was at fault.

No conclusions are drawn by Smith and Kirby[6] in their study of 20 cases, but they express a belief that the earlier the treatment is started the quicker the relief from the paroxysms and the shorter the course of the disease.

De Puelles y Ruiz,[7] in the Spanish *Archives of Pediatrics*, expresses gratification with results of x-ray exposure of the chest in pertussis and ascribes the beneficial effect to the reduction of the tracheobronchial glands.

A similar effect is described by Boner[8] in his brief report of 6 treated cases.

Leonard,[9] in the *American Journal of Roentgenology*, analyzes a preliminary study of 50 cases and shows that 75 per cent of the patients are relieved of symptoms in the paroxysmal stages and that vomiting promptly ceases. He does not find the course of the disease shortened except in babies under two years of age.

In an analysis of 850 treated cases of pertussis Smith and co-workers[10] conclude that the number and severity of the paroxysms is reduced and the course of the disease is shortened. They find that the greatest benefit from x-ray exposures occurs in the paroxysmal stage of the disease, and they note the best response in the younger patients. They give warning of possible harmful effects on the thyroid and thymus glands.

In an excellent study of 102 cases made by Julius Hess,[11 12] it was found that the best results were obtained in those patients who had high white counts, with 50 to 80 per cent lymphocytes. Hess justifies the use of roentgen rays by the finding of enlarged peribronchial lymph nodes and hilar mottling and the knowledge that x-rays reduce the size of hyperplastic lymph nodes. He takes issue with Bowditch's original method of giving exposures every other day on account of the danger of resulting thymic atrophy. His exposures were never less than five days apart, usually seven, from one to four treatments being given. The most striking effect noted was the relief from vomiting and a diminution in the number and severity of the paroxysms. Marked improvement occurred within twenty-four hours. In a few instances there followed for twelve to eighteen hours increased irritability, wakefulness and nervousness, which Hess interpreted as due to a possible overdosage for the individual. He expresses the belief that x-ray exposures should not be given until the patient is in the paroxysmal stage, lest development of immunity be arrested by aborting the disease. This seems a logical stand to take if we wish to protect our patients against future recurrences. In Hess' series the summer and fall cases showed better response to treatment than the winter cases and this has been my own experience.

Thus far all reports have been favorable to the use of x-rays, but there are dissenters, notably Faber and Struble,[13] who controlled 22 test cases by 22 cases receiving only antipyrine. They found that those patients receiving x-ray exposures ran a longer course, namely: 62.5 days as against 54.5 days for the controls. They further found that fewer of the test patients ceased whooping in the early weeks and more of them were still whooping in the late weeks than among the controls. They conclude that x-ray therapy is without true beneficial effect in pertussis and criticise the Boston investigators for failing to control their work. Willcox[14] confirms Bowditch's findings of glandular hypertrophy at the lung roots in pertussis.

In a review of 20 cases studied intensively in the wards of the Boston Floating Hospital and 200 outpatient cases Leonard[15] found that the youngest patients and the earliest cases derived the greatest benefit. Three exposures were given at forty-eight-hour intervals with a total of two-thirds erythema dose. The reduction in the number and severity of the paroxysms was striking. From skiagraphs of the chest taken before and after treatment, he concludes that the beneficial results bear a relation to the effect which the x-rays have on the bronchial lymph nodes.

Of 22 patients treated by Sheridan,[16] only one failed to show any improvement, while 50 per cent showed abortion of the disease or marked improvement within a few days, notably in the amelioration of vomiting. The course of the disease was shortened and the mortality lowered.

From Germany comes a study of the effect of roentgen rays on the blood picture by Schrutz and Vychytil.[17] These authors believe that the hilar adenopathy occurring in the disease leads to the characteristic blood picture. Since the x-rays restore the tracheobronchial lymph nodes to normal, they not only relieve the cough and vomiting, but the blood picture returns quickly to normal. They believe that the best time to radiate is during the convulsive stage, at the third or fourth week.

Among other foreign observers there are reports by von Hrabovsky,[18] Fraticelli,[19] Michailovsky,[20] Radu and Ackerman[21] and Melo,[22] who collectively treated 99 cases in all stages of the disease. There is uniformity of opinion that x-rays offer a very valuable therapeutic agent in controlling the severe symptoms of pertussis.

To the foregoing cases I wish to add for brief analysis 21 of my own patients in private practice. The treatments were all given by Drs. Samuel and Bowie, employing the following technic: 5 minutes' duration, 140 kilovolts, 5

ma., 20 in. distance, ¼ mm. copper and 1 mm. aluminum filter. Exposures were usually given at weekly or ten day intervals, though in one severe case three treatments were given at intervals of five days. Four patients in early paroxysmal stages were sufficiently relieved by one exposure to be considered cured. Eleven had 2 exposures and were markedly improved; 4 had 3 and 1 had 4 exposures. Five of this series had had preliminary vaccine therapy, 4 doses each of Lederle's pertussis combined vaccine being injected subcutaneously on alternate days. The vaccine had been given in the preparoxysmal stage in each instance as soon as the diagnosis was established. So severe did these cases become that it was evident that the vaccine was without the slightest beneficial effect. It was one of these 5 that was promptly cured after one exposure, with no residual cough. As was noted by Hess,[11 12] the summer and early fall cases responded better than the winter cases. Fifteen of the series which required only one or two treatments were all summer cases.

One patient was an infant of six weeks, the daughter of one of our medical confreres who contracted the disease from older children in the family. So severe was the vomiting in this case that her life was endangered, although she had received four injections of vaccine as soon as it was known that she had been exposed. She received only one exposure to the x-rays. Vomiting ceased the following day and did not recur. It was not deemed necessary to give further treatments.

It is very difficult in private patients to determine the duration of an ambulatory disease such as pertussis, and therefore I can only offer the impression that there seemed to be a definite shortening of the course. Instead of following these patients through ten to twelve weeks of coughing, many of them returned in four or five weeks for other ailments, entirely symptom-free as regards pertussis.

The mechanism of the action of roentgen rays in whooping cough is not clearly known and there is no uniformity of opinion of the authors on this subject. Some are of the opinion that the favorable effect is due to the analgesic and disinfecting properties of the rays. Leonard explains the favorable results as due to a decrease in the size of the tracheobronchial lymph nodes. Picherle ascribes them to the effect of the rays on the mucosa of the respiratory tract, decreasing the swelling and alleviating the irritation of the nervous system. This view is also shared by Sanchis. According to some writers, we are dealing here essentially with an auto-protein inoculation therapy, resulting from the effect of roentgen rays.

The assumption of an increased sensitiveness to proteins presumably responsible for asthmatic symptoms led to the roentgen treatment of cases of asthma without, however, favorable results. I am inclined to the belief that the good results in pertussis are due to the influence of the rays on the bronchial ganglia and to the effect on the peribronchitis and adenitis. The x-rays undoubtedly lead to a decrease of the local infiltration. It is also possible that they have a direct action on the vegetative nervous system, decreasing the irritability of the parasympathetic and in consequence diminishing the frequency of paroxysms.

In conclusion, I wish to state that in x-ray treatment of pertussis we have available the most effective agent for relieving the distressing symptoms of the disease, shortening its course and preventing the dangerous complications which are often encountered.

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DISCUSSION (*Abstract*)

Dr. W. L. Funkhouser, Atlanta, Ga.—Epidemics of whooping cough vary in intensity. Some are so mild that it is often impossible to make a diagnosis, while in others the virulence of the infection is so severe that it becomes distressing. Any therapeutic measure tried during the prevalence of a mild infection appears to give excellent results; consequently, many procedures in the treatment of whooping cough have been advised which, when tried during a severe epidemic, appear to give litt'e or no relief. This is my feeling in regard to x-ray therapy of whooping cough.

When Bowditch and his co-workers reported their large series, I was very anxious to give their procedure a trial. Shortly after, I had occasion to treat 15 cases. Nine had 3 treatments, one every other day. Of these, one showed marked improvement; 3 some improvement; in 4 cases, no definite statement could be made as to results; and in one, there was no improvement. Four cases had 4 treatments with no improvement; 2 cases had one treatment. Of these, one was cured by one treatment and one did not return.

In whooping cough I believe that if any procedure stops the cough by one treatment it is evidence of a mistaken diagnosis. Of the 13 patients who had whooping cough and were treated by x-ray therapy, 3 were improved, 5 showed no improvement, and in 5 cases no definite statement could be made as to results. Their ages varied from seven months to seven years. The roentgenologist and I differed as to results. He felt that definite improvement was obtained, especially in the early cases; while I felt that little or no results were obtained, improvement in the late case being due probably to the action of the ray on the enlarged bronchial glands.

Not being especially impressed with results and fearing the damage to either the thymus or thyroid, I discontinued x-ray therapy. Since Bowditch's report very little has appeared in the literature. In the September issue of the *American Journal of Diseases of Children* there was an abstract from an article by Fraticelli reporting 42 cases. He thought that he obtained good results especially in the early cases, stating that the first symptom to be relieved was vomiting. Vomiting, however, has not been an early symptom in my cases.

Having had no experience with x-ray therapy for eight years, I wrote to one of the co-authors of the paper published by Bowditch in 1925, to ascertain their results up to date. I received the following reply:

"We use the x-ray very se'dom now in the treatment of whooping cough. It is not being done by the Floating Hospital as an institution, at all. The x-ray man will give the treatment on request, and sometimes with a particularly severe case I have it done to quiet the parents and in the hope that it may do some good."

While we need some satisfactory measure for treating whooping cough, I do not believe that the x-ray therapy will solve our problem unless better results can be obtained by an improvement of technic.

Dr. W. Ambrose McGee, Richmond, Va.—For fear of injuring the thyroid, parathyroid and thymus glands I have hesitated to employ that form of therapy in pertussis. Those who originally advocated that plan of treatment have almost ceased using it.

To my mind there are several drawbacks to this treatment, namely: a most competent roentgenologist is required; it is not applicable to children in small communities; it exposes other children to the disease; it is not possible where complications such as pneumonia are present, and parents as well as some physicians fear the x-ray.

Over a period of six years and through epidemics of different severity I have had most encouraging results with rectal ether in treating pertussis. Controls were used and the results from different common measures of treatment (such as vaccines, ephedrinehydrochloride, cough sedatives and antispasmodics) were compared with those of rectal ether. The advantages of ether and oil per rectum are that the mixture is easily available, can be administered well by parents, causes no damage to any part of the body, is not apt to frighten children as hypodermic injection or vaccine or x-ray therapy does, and clinical improvements parallel favorable changes in the blood picture (reduction of total white cells and lowering of the shift to the left in the differential count).

The results with rectal ether will vary in different hands, due to lack of proper cooperation between physician and child or the parents and child; difference in the strength of the solution used and the frequency with which it is administered; difference in method of administering the rectal ether and failure of attention to details which favor retention of the drug. Attempts to diagnose pertussis prior to the whoop by consideration of the suspicious cough and by use of the white and differential blood counts and isolation of the Bordet-Gengou bacillus also aid in obtaining more favorable results.

Regardless of the form of therapy used for pertussis I feel we should employ the method that consistently gives the greatest percentage of success in the minimum time and with the least effort and cost.

Dr. Von Meysenbug (closing).—It does not surprise me that the general tenor of the discussions is unfavorable to the subject that I have presented. I might add that, like Dr. Funkhouser, I, too, wrote to one of my Boston friends to get an expression of the present status of x-ray exposure for whooping cough. The reply was similar to the one he received, namely, that it is no longer in use at the Floating Hospital or in general practice.

However, the fact that others do not use a remedy that I have had happy results with, and one that is absolutely safe, will not prejudice me against it. The dose is the thing. After much trial and experience Dr. Samuel has worked out a dosage and method that is not only safe but that gives results.

Southern Medical Journal

JOURNAL OF THE

SOUTHERN MEDICAL ASSOCIATION

Published monthly by the Southern Medical Association, Empire Building, Birmingham, Ala. Annual subscription $4.00. Single copies 35c each.

Entered as second-class matter at the Post Office at Birmingham, Ala., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1106, Act of October 3, 1917, authorized December 20, 1921.

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Volume XXVI JUNE 1933 Number 6

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Twenty-Seventh Annual Meeting
Richmond, Virginia, November 14-17, 1933

CONGENITAL SYPHILIS

The question of marriage of syphilitics is a constantly recurring one. While modern treatment has greatly reduced the infectivity of syphilitic individuals, actual cure of the disease even by the best of treatment is questioned; and the possibility of syphilitic offspring presents a grave obstacle to matrimony.

The frequency of syphilis among negroes in the South and the increasing activity of public health officials and the medical profession against venereal disease has permitted the collection of many very instructive statistics from Southern hospitals and clinics. Reinberger and Toombs,[1] of Memphis, in this issue of the JOURNAL, report on 1,000 cases of syphilis of pregnancy. Hines Roberts,[2] of Atlanta, has recently analyzed a series of 903 infants who were either syphilitic or born of known syphilitic mothers. Both papers deal with syphilitic women and their offspring. Points of agreement and some slight differences in the results are of interest.

According to the Memphis authors, infection of the fetus occurs in direct ratio to the duration of pregnancy before antisyphilitic treatment begins. Treatment should be administered during pregnancy to all women who have ever had syphilis, even though they appear clinically and serologically negative. Treatment is beneficial even if it begins in the later months; but even the most thorough course of antisyphilitic therapy fails to eliminate congenital syphilis in 100 per cent of the offspring. Without treatment there was no hope, since infection of the fetus occurred in 100 per cent of the infants of untreated syphilitic mothers. A moot point upon which both these papers agree is that of the so-called false positive Wassermann reaction in pregnancy. Pregnancy, according to both Roberts and Reinberger and Toombs, does not alter the Wassermann reaction.

In Roberts' series it was attempted to determine the probable fate of the infants of syphilitic mothers; to outline the means of diagnosis of congenital syphilis, the age of appearance and frequency of certain physical signs, and the value of prenatal therapy. In his group 607 babies born of syphilitic mothers, or nearly three-fourths of the babies of all the treated and untreated mothers, were non-syphilitic.

Of 317 infants born of untreated syphilitic mothers, about one-third, or approximately 30 per cent, it was estimated, escaped infection. This figure is considerably higher than is usually reported, and in disagreement with that of the Memphis clinic. Much more was accomplished by natural resistance than is usually expected in this disease.

The diagnostic signs of syphilis in early infancy are differently reported by different authorities. According to Roberts, a Wassermann of the umbilical cord blood has little or no significance. About 37 per cent of syphilitic infants studied gave negative cord blood reactions, and positive cord Wassermanns were obtained in children who subsequently were shown to be free of infection. The value of the cord Wassermann as an indication for treatment has been questioned in other clinics[3] also. An infant born of a syphilitic mother and reaching the fourth month of life without physical or serological evidence of the disease, according to Roberts' statistics, will escape infection.

If the present depressing abundance of syphilitic material in Southern hospitals continues, Southern physicians should soon become the

1. Reinberger, James R.; and Toombs, P. W.: The End-Results of Ten Years' Study of Treatment of Pregnancy Syphilis in Trimesters. Sou. Med. Jour., this issue, p. 532.

2. Roberts, Hines: Congenital Syphilis. Amer. Jour. Dis. Child., 45:461, March, 1933.

3. Editorial, Diagnosis of Congenital Syphilis in the Newborn. Sou. Med. Jour., 25:553, 1932.

greatest syphilologists of the world. In no other country or section of the country, possibly, are patients so available and facilities for their study so well provided.

NITROGEN AND CANCER OF THE STOMACH

Since the early days of Beaumont and his patient, Alexis St. Martin, with gastric fistula, the presence of the mineral acid, hydrochloric, in the healthy human stomach has occupied a great deal of medical attention. The finding of an achlorhydria is always of clinical interest. When disease of the stomach is suspected and laboratory studies are to be made, the gastric juice is examined for its content of free hydrochloric acid, for the presence of blood, lactic acid, certain ferments and enzymes, and bacteria, such as the Oppler-Boas bacillus. Estimation of the nitrogen components of the juice is not included in routine examinations even of diseased stomachs. Their presence in normal juice has recently been shown and bids fair to prove of considerable importance.

In the early part of the present century, biochemists developed the various micromethods for measuring several nitrogen compounds of the blood. The quantities of protein nitrogen, nonprotein nitrogen, urea nitrogen, uric acid, amino acid nitrogen, ammonia, and creatinine, per 100 c. c. of blood, were shown to vary within rather narrow limits in health. Certain quantitative changes are characteristic of disease. Kidney impairment, for example, is accompanied by the retention of nonprotein nitrogen and urea in the blood, in the early stages, and in the late stages by retention of creatinine. Similar diagnostic and prognostic changes may be observed in prostatic obstruction and in other diseases. Polland, Roberts and Bloomfield,[1] of Stanford University Medical School, in 1928, examined the gastric juice at intervals after histamine injection and found that it normally contained 40 to 100 milligrams per cent of nitrogen. In achylia the total nitrogen was increased.

Lay Martin,[1] of Johns Hopkins, in 1931 made rather extensive studies of the nitrogen fractions of human gastric secretion. Using suitable modifications of the usual methods of blood chemical analysis, he established normal values for the total nitrogen of gastric juice and for the various nitrogenous substances mentioned above. Normal individuals and hospital patients with various diseases were examined. Characteristic elevations of these compounds were observed in simple achylia, and greater elevations in cases of achylia with carcinoma.

In nephritis, elevations of the nitrogen compounds of the stomach secretion were observed. As kidney function is impaired, the nonprotein nitrogen and urea nitrogen of the gastric juice tend to rise, the stomach apparently entering into a compensatory reaction to dispose of excretory products which cannot escape via the kidney. The increase in intestinal excretion of nonprotein nitrogen in nephritis confirms the belief that the nitrogen secreted into the stomach juice is not resorbed.[2]

In pernicious anemia, the amino acid nitrogen and the urea nitrogen were considerably above normal. Since the modern theory of pernicious anemia is that it is a disease of the stomach mucosa, in which the gastric secretion is deficient in a protein splitting enzyme, the discovery of the increased urea content of the juice is of interest. The large quantities of urea suggested to Martin[2] the possibility of a diminution in the activity of the urease, or urea splitting enzyme, which is normally to be found in the gastric juice.

The nitrogen components of the gastric juice in gastric and duodenal ulcer showed no noteworthy changes from the normal. In benign achlorhydrias, the protein and nonprotein nitrogen were about twice normal. In cases of ulcer which simulated malignancy but which at operation proved to be benign, the nitrogen analysis of the stomach contents showed normal values. In proven cases of carcinoma of the stomach with achlorhydria, the protein and nonprotein nitrogen were increased to from four to six times the normal, although the nonprotein nitrogen of the blood was not elevated. Other nitrogen components of the gastric juice, the amino acid nitrogen, urea and ammonia nitrogen, were also elevated. In carcinoma with free acid, diagnostic differences were not shown.

The possibility that the stomach may act as an additional channel of excretion when the kidney is inadequate indicates a close and hitherto unsuspected connection between diseases of

1. Martin, Lay: Total Nitrogen and Nonprotein Nitrogen Partition of the Gastric Juice Obtained After Histamine Stimulation. Bull. Johns Hop. Hosp., 49:286, 1931.

2. Martin, Lay: Protein Nitrogen and Nonprotein Nitrogen Determinations on Gastric Juice. J.A.M.A., 100:1475, May 13, 1933.

the kidney and of this other vital organ. Martin's studies upon the nitrogen of the gastric juice in health and disease throw considerable light upon the subject of gastric carcinoma, and if confirmed will hold out a hope of early diagnosis which could not be offered by gastro-enterologists of a very few years back.

GLEANINGS FROM RECENT JOURNALS

Scurvy and the Suprarenals.—The guinea pig is peculiarly liable to scurvy and shows symptoms in a very few days of a scorbutic diet. Some work has tended to show that vitamin C and hexuronic acid, a reducing substance which is crystallized from lemon juice, are identical. Siehrs and Miller,[1] of Northwestern University Medical School, report that the suprarenals of guinea pigs, which normally contain hexuronic acid, rapidly lose their store of this substance on a scorbutic diet. When vitamin C is restored to the ration, again the suprarenals in a few days show the reaction for hexuronic acid.

Infant Nutrition.—Lactic acid milk for infant feeding has usurped the place which a few years ago was assigned to dried milk and other cow's milk modifications. Whether it has actually solved the problem of infant nutrition is seriously questioned by Gerstley,[2] of Chicago, in comparative studies of infant digestion of breast milk, cow's milk, and lactic acid milk, with and without the addition of lactose. He interprets his results to mean that the addition of lactic acid to cow's milk lightens the burden on the stomach, but probably does not relieve the intestines or the body cells from the burden of a whole cow's milk diet. Lactic acid milk, he says, is a food that usually leads to overfeeding, and is a possible cause of metabolic injury.

A Well Known Modern Author on the Doctor.—The medical profession has received some criticism from lay writers since the days of Robert Louis Stevenson's oft-quoted eulogy. Medical practice and medical education have changed, as the public has changed, and whole-hearted compliments in print are rarer. The opinion of Ludwig Lewisohn,[3] in an essay on "The Fallacy of Progress" is worthy of repetition. In this age, according to Lewisohn, people have

> "substituted for their ancestral culture, which was difficult and made definite demands on them, an appreciation of technical progress which makes no demands at all upon the deeper sources of one's being. . . . . The ways of the machine age . . . . give the flabbiest fool a chance which, did he but know it, is his final undoing. . . . . In this age . . . . there has been progress in every kind of human effort in which the means could not from the nature of things be mistaken for ends. . . . . The progress made by modern medicine . . . . . is true progress toward the amelioration of man's lot. Nor have the physicians, the vast majority exemplars of the peculiar bourgeois virtue of disinterestedness, often taken part in the great game of substituting Utopia for reality. They are almost the only respectable class of men—I mean worthy of respect—left in our society."

This is high praise for a crowded profession, which it is hoped will continue to deserve it.

TWENTY-FIVE YEARS AGO

Leprosy.—We have read with interest a report of an institution in Louisiana in which a form of hygienic treatment [for leprosy] is said to be adopted, which may lead to what is claimed to be the cure and which benefits many. The institution is said to have been in existence for thirteen years and is conducted by six sisters of charity, none of whom have become infected with the disease. Much freedom is given the inmates and no particular effort made to prevent their escape.—(Editorial, Treatment of Leprosy, *Boston Medical and Surgical Journal*, 159:22, 1908.)

Cesarean Section.—At the thirty-third meeting of the American Gynecological Society in Philadelphia, Dr. Barton Cooke Hirst made a plea for conservatism in resorting to cesarean section. . . . . The indication of labor two to four weeks before term obviates the necessity.

Dr. A. Lapthorn Smith, of Montreal, said that the operation of cesarean section has been so perfected that when performed by an experienced abdominal surgeon it has now hardly any higher death rate for mother and child than normal labor. This cannot be said of prolonged application of forceps, nor of even the best of the suprapubic methods.

President Baldy discussed the general administration of anesthetics as performed today, and expressed the hope that a salaried anesthetizer would be placed in each and every hospital in the land. . . . . Women have been tried and

1. Siehrs, A. E.; and Miller, C. O.: Disappearance of Vitamin C from the Adrenals of Guinea Pigs Having Scurvy. Proc. Soc. Exper. Biol. & Med., 30:696, March, 1933.

2. Gerstley, Jesse R.: Infant Nutrition. Amer. Jour. Dis. Child., 45:538, March, 1933.

3. Lewisohn, Ludwig: The Fallacy of Progress. Harper's Magazine, p. 103, June, 1933.

are proving most satisfactory as anesthetists.—(*Boston Medical and Surgical Journal*, 159:17, 1908.)

Missouri.—It is reported that there are about 60 cases of smallpox in Jefferson City.

Tennessee.—The smallpox situation in Madison County and Jackson is becoming serious, as 28 cases have been reported in the district.

Virginia.—Smallpox is reported to have been epidemic at Norton for several weeks.

Mexico.—Smallpox continues prevalent in the vicinity of Molino de Enmedia. The epidemic of smallpox at Santa Ana continues.—(Medical News, J.A.M.A., 50:47, 289, 291, 292, 1908.)

Typhoid in Massachusetts.—On March 31, 1908, after several months of practical freedom from typhoid fever, a case of that disease occurred in Jamaica Plain. There were reported during a period of about six weeks no fewer than 410 cases. The majority of cases proved to be in families supplied by two milk men. One of these had been ailing for a period of about two weeks before he took to his bed with typhoid fever, but not to such an extent as to prevent him from handling the milk. Milk cans interchanged without sterilization between this man and another milk man were thought to have infected the second supply.—(Charles Harrington, Professor of Hygiene, Harvard Medical School, Secretary of the State Board of Health of Massachusetts, "An Unusually Extensive Milk-borne Outbreak of Typhoid Fever," *Boston Medical and Surgical Journal*, 159:5, 1908.)

Book Reviews

Diseases of the Heart. Described for Practitioners and Students. By Sir Thomas Lewis, C.B.E., F.R.S., M.D., D.Sc., LL.D., F.R.C.P., Hon. D.Sc. (Michigan), Physician-in-Charge of the Department of Clinical Research, University College Hospital, London. 297 pages. New York: The Macmillan Company, 1933. Cloth, $3.50.

This book will naturally be of interest to a wide group of readers because of the author's merited reputation as one of the foremost authorities on certain phases of cardiac disease. In his preface the author states that the book is intended primarily for students and physicians doing general practice, and that it represents his own impressions rather than a critical review of the subject of cardiac disease.

The author deals first with the two important syndromes, congestive heart failure and angina pectoris. A discussion of some of the chief symptoms follows and the final chapters are devoted to the various etiological types of heart disease. The book is well written and the author has the happy facility of saying a great deal in a few words. The sections dealing with arrythmias are, as would be expected from the author's special interest in the subject, excellent. The chapter on syncope is also unusually good. The author's point of view is rather similar to that of Sir James Mackenzie, and most of the clinical material is similar to that in the last edition of Mackenzie's book on the same subject.

Although this volume is a good clinical treatise on heart disease, it suffers from several fundamental flaws. In the first place, the subject of left ventricular failure and pulmonary congestion is scarcely mentioned, the author stating that the early signs of congestive heart failure are to be found in the systemic veins. This is a serious error, for it tends to add further confusion to a subject which is already confused in the minds of many cardiologists. The author neglects the recent work which tends to establish the validity of the "back pressure" theory of heart failure. His conception of the mechanism of cardiac dyspnea is a mistaken one. His discussion of edema is less complete than the importance of the subject merits, and no mention is made of the fundamental investigations of the Starling school, although these studies brought out the physiological principles on which any sound conception of cardiac failure must be based. He still believes that digitalis has very little value except in cases of auricular fibrillation, an idea which was once widely accepted but which has been shown time and again, in recent years, to be erroneous.

In summary, it may be said that as regards its purely clinical features, this is a satisfactory book and should be of great value to students, general practitioners and internists who are not thoroughly familiar with the writings of Sir James Mackenzie. In so far as the fundamental conceptions of cardiac physiology and cardiac failure are concerned, the book cannot be recommended.

The Principles of Treatment of Muscles and Joints by Graduated Muscular Contractions. By Morton Smart, C.V.O., D.S.O., M.D., Ch.B., Edinb., Late Medical Officer in Charge of the Electrotherapeutic Department, Hospital for Sick Children, Great Ormond Street, London; Fellow of the Royal Society of Medicine Commander, R.N.V.R. 217 pages. New York: Oxford University Press, 1933. Cloth, $3.75.

The author with characteristic English thoroughness uses up the greater part of the fourteen chapters of his monograph in a review of the anatomy, histology, physiology and pathology of muscles and joints in general. After a lengthy discussion of these subjects he devotes one chapter to the technic of manipulation of joints and three chapters to the technic he employs in the actual treatment by graduated muscular contractions of various pathological conditions of muscles and joints. The last chapter describes the electrical machine which he uses to produce graduated muscular contractions. He makes it definitely understood that electricity *per se* is of no virtue as a curative agent, but is merely used as the best stimulus to produce the exact degree of muscular contraction desired. By contractions and relaxations with accompanying chemical and circulatory changes, the desired results are obtained. The author propounds very clearly a method of treatment little understood in this country.

Principles and Practice of Obstetrics. By Joseph B. DeLee, A.M., M.D., Professor of Obstetrics and Gynecology at the University of Chicago; Chief of Obstetrics, Chicago Lying-In Hospital and Dispensary; Consulting Obstetrician to Provident Hospital, to the Chicago Maternity Center, etc. Sixth Edition, Thoroughly Revised. 1,165 pages with 1,221 illustrations on 923 figures, 265 of them in colors. Philadelphia and London: W. B. Saunders Company, 1933. Cloth, $12.00 net.

For completeness of text and attention to illustration this edition offers a splendid and readily accessible postgraduate study. Simplicity of expression, pleasing sequence of thought and detailed discussion mark the presentation of subject material as the work of a great teacher and thoughtful clinician. Fundamental and traditional obstetric truths and practices have been given the usual lucid and careful consideration that has marked former editions by the author and that renders the book a storehouse of information for every physician practicing obstetrics. In addition, the written text is ably augmented by splendid illustrations that create mental pictures of value and usefulness. There has been little revision of the edition published in 1930 and material dealing with progress in obstetrics has been inserted with the same careful selection as characterized the review of the basic teachings of this science.

Among the new subjects may be mentioned local anesthesia in obstetrics, the Aschheim-Zondek test, the endocrine changes of pregnancy and alterations to the chapters on syphilis, diabetes, heart disease and tuberculosis as they relate to pregnancy. If there is any disappointment in the edition it is referable only to the index. This phase of the book is so elaborate as to be confusing.

Neurology and Psychiatry of the Practical Medicine Series, 1932. Neurology edited by Peter Bassoe, M.D., Clinical Professor of Neurology, Rush Medical College of the University of Chicago. Psychiatry edited by Franklin G. Ebaugh, A.B., M.D., Director, University of Colorado Psychopathic Hospital; Professor of Psychiatry, University of Colorado School of Medicine. 488 pages, illustrated. Chicago: The Year Book Publishers, Inc., 1933.

As always the Year Book is filled with the latest work in neurology and psychiatry. Twenty pages are given to recent work upon traumatic affections of the central nervous system. The increasing importance of this subject in present day medicine is appreciated by all.

Dr. Cushing's description of the clinical picture of basophilic adenoma of the hypophysis is summarized, also his work on the relationship between brain lesions and gastric ulcer. This is merely to name a few of the many outstanding advances which are described.

Outline of Preventive Medicine. Prepared Under the Auspices of the Committee on Public Health Relations, New York Academy of Medicine. 24 contributors. Second Edition, Revised and Enlarged. 462 pages. New York: Paul B. Hoeber, Inc., 1932. Cloth, $5.00.

This book seems designed to enable the practitioner to take up some of the lag between the teaching and the application of preventive medicine. The editors state "and the intelligent layman," but it will take unusual lay intelligence to comprehend this text. The twenty-four contributors have rewritten the entire volume, added three chapters and have summarized "all that is known about the prevention of illness or its sequelae in every branch of clinical medicine." This method of writing allows some overlapping and at times ambiguousness when the statements of two different writers are scrutinized, unless the editorial board is very alert. However, the completeness with which the subject is covered and the methods which are outlined, will enable the practitioner to make accurate and creditable examinations.

Report on Sixth International Congress of Military Medicine and Pharmacy and Meetings of the Permanent Committee. The Hague, Netherlands, June, 1931. Report of Commander William Seaman Bainbridge, M.C.F., U.S.N.R., for the Delegation from the United States of America. 166 pages. Washington, D.C.: United States Government Printing Office, 1933. Cloth, $1.00.

Five subjects were reported on by the military congress. They are: "Recruiting, Training and Advanced Training of Military Medical Officers and Pharmacists," "Psychoneuroses of War," "Methods of Hemostasis on the Battlefield," "The Preparation and Storage of Medical Ampoules in Use in the Naval and Military Medical Services" and "The Sequelae of War Wounds of the Teeth and Inferior Maxilla." Each topic is assigned to certain countries, but all the participants are expected to deliver communications on phases of the subject.

The Congress decided that, although war does play some part in the genesis of mental disturbances, the factors of heredity and degenerative conditions must be reckoned with. Prophylaxis consists of excluding these men from war service. No new psychoses were found during the War. These reports are valuable in their application to civil life as well as arousing progress in a specialized field.

Diseases of Tradesmen. By Bernardino Ramazzini (1633-1714), with which is bound Silk Handlers' Disease of the Skin, by Herman Goodman, B.S., M.D., New York City. 95 pages. New York: Medical Lay Press, 1933. Cloth, $1.50.

This little book, which can be read easily in a couple of hours, is divided into three parts. The first is a biographical sketch of Bernardino Ramazzini, who seems to have been a man of parts in the Italy of his day. He wrote the original "Diseases of Tradesmen." The second part of the present work is made up of interesting excerpts from various chapters of Ramazzini's book.

The third part is Dr. Goodman's short paper on silk handlers' disease of the skin. In this he gives a description of the various processes through which the silk is taken from the original worm to the final thread. He gives clinical descriptions of the inflammation of the skin of the hands of the mill workers and the account of the interesting researches through which he finally concludes that the cresol used in the anti-mildew solution is the cause of the trouble and not the silk itself.

What to Tell the Public About Health. A collection of short articles aimed to present in simple terms the facts about the prevention of disease and the promotion of health. 255 pages. New York: The American Public Health Association, 1933. $2.00.

These collected articles are couched in very simple language and stress a single point. They are not copyrighted and can be used with freedom in the advancement of public health. The foreword gives some hints as to the proper methods of health instruction. In the appendix is a list of literature which is available for public distribution. The practitioner will find this a gold mine of material for talks in his community.

Asthma, Hay Fever and Related Disorders. By Samuel M. Feinberg, M.D., F.A.C.P., Assistant Professor of Medicine and Attending Physician in Asthma and Hay Fever Clinic, Northwestern University Medical School. 124 pages, illustrated. Philadelphia: Lea & Febiger, 1933. Cloth, $1.50.

This short work is written as a guide for patients. It is an attempt to teach people to think of allergy without going far enough to encourage self-treatment. It errs mostly on the side of brevity. The chapter on specific allergens contains no recipes or formulas. The book has material of broad educational value.

Southern Medical News

ALABAMA

The Chambers County Medical Society has elected the following officers for 1933: Dr. W. D. Gaines, Lafayette, President; Dr. J. L. Weldon, Lanett, Vice-President; and Dr. W. H. Riser, Lafayette, Secretary-Treasurer.

The Clarke County Medical Society has elected the following officers for the coming year: Dr. J. G. Bedsole, Jackson, President; Dr. A. L. White, Thomasville, Vice-President; Dr. R. D. Neal, Grove Hill, Secretary; and Dr. G. C. McCrary, Jackson, Treasurer.

The Sumter County Medical Society has elected the following officers for the coming year: Dr. R. E. Hale, Bellamy, President; Dr. W. E. Allen, Ward, Vice-President; and Dr. J. S. Hough, Livingston, Secretary-Treasurer.

The Wilcox County Medical Society has elected the following officers for the coming year: Dr. Paul Jones, Camden, President; Dr. P. E. Godbold, Pine Hill, Vice-President; and Dr. E. L. McIntosh, Camden, Secretary-Treasurer.

Dr. P. M. Hodgson, Stockton, has succeeded Dr. H. J. Sims, deceased, as a member of the Board of Censors of the Baldwin County Medical Society.

The John A. Andrew Clinical Society, for the advancement of negro physicians, held its twenty-second annual clinic and sixteenth annual meeting at the John A. Andrew Memorial Hospital, Tuskegee Institute, in April, with a large number of negro physicians from all over the United States in attendance.

Deaths

Dr. Sibley Holmes, Foley, aged 60, died March 9 of mastoid infection following influenza.

Dr. William Wiley Walls, New Hope, aged 48, died March 4 in a Birmingham hospital of agranulocytosis.

Dr. Fred Tracey Nye, Irvington, aged 77, died February 7 of myocarditis.

Dr. David Harris Walker, Tuscumbia, aged 68, died suddenly March 11 of heart disease.

Dr. Leon Clive Havens, Montgomery, aged 41, died March 19 of heart disease.

Dr. Leon H. Mayo, Birmingham, aged 50, died March 12 of brain tumor.

ARKANSAS

The Arkansas Medical Society, at its annual meeting at Hot Springs National Park in May, elected the following officers for 1933: Dr. F. O. Mahony, El Dorado, President-Elect; Dr. Dewell Gann, Sr., Benton, First Vice-President; Dr. J. H. Fowler, Harrison, Second Vice-President; Dr. John E. McGuire, Piggott, Third Vice-President; Dr. R. J. Calcote, Little Rock, reelected Treasurer; and Dr. William R. Bathurst, Little Rock, reelected Secretary. Dr. L. J. Kosminsky, Texarkana, is the incoming President.

Dr. William G. Hodges, Malvern, Dr. Wells F. Smith, Little Rock, and Dr. Thomas Wilson, Wynne, are new members of the Arkansas Board of Health, recently appointed.

Dr. William B. Grayson, McGehee, was recently elected State Health Officer and Secretary of the Board of Health, succeeding Dr. Charles W. Garrison.

Dr. S. R. Crawford, Little Rock, Chief of the Medical and Surgical Unit of the Veterans' Administration in Little Rock, is taking postgraduate work at the Administration's diagnosis center at Palo Alto, California, having been designated for this course in recognition of his service.

The Tri-County Medical Society, composed of Ouachita, Union and Columbia Counties, met at Magnolia April 11 for its spring meeting.

The Monroe County Medical Society has elected the following officers for the coming year: Dr. F. S. Dozier, Brinkley, President; Dr. A. H. Gilbrech, Clarendon, Vice-President; and Dr. C. A. Henry, Clarendon, Secretary-Treasurer.

The Third District Medical Society has elected the following officers for the coming year: Dr. L. E. Biles, Augusta, President; Dr. Thomas Wilson, Wynne, Vice-President; and Dr. J. O. Rush, Forest City, Secretary-Treasurer.

The Eighth Councilor District of the Arkansas Medical Society, composed of Faulkner, Pulaski, Conway, Perry, Yell, Pope and Johnson Counties, has elected the following officers for the coming year: Dr. M. J. Kilbury, Little Rock, President; Dr. L. Gardner, Russellville, Vice-President; and Dr. Clyde Rogers, Little Rock, Secretary-Treasurer.

Dr. A. J. Dunklin, formerly of Clarendon, has located at Arkadelphia.

Dr. J. R. Kitley, Mayflower, has been reelected Mayor of Mayflower.

Dr. F. C. Maguire, Augusta, is the newly appointed Coroner of Woodruff County.

Dr. Martin C. Hawkins, Jr., has moved from Little Rock to Searcy, where he will be associated with Dr. A. G. Harrison.

Dr. A. C. Kolb, Hope, was recently appointed a member of the new Board of Control for the State Hospital for Nervous Diseases.

Dr. E. H. White, Little Rock, has moved into new offices in the Donaghey Building.

Deaths

Dr. John Felix Wilson, Dalark, aged 61, died January 15 of hypertension.

Dr. John Mills Young, Little Rock, aged 66, died March 1 of cerebral hemorrhage and arteriosclerosis.

Dr. James Henry Voris, Conway, aged 55, died February 7 of heart disease.

DISTRICT OF COLUMBIA

The Beaumont Medical Society, a medical society for undergraduates at George Washington University School of Medicine, Washington, was recently organized in honor of Dr. William Beaumont, who, one hundred years ago, was given the honorary degree of doctor of medicine by George Washington University.

Dr. Joel T. Boone, Washington, Captain, Medical Corps, U. S. Navy, has terminated his assignment as physician at the White House and has been assigned to the Naval Medical School at Washington.

Deaths

Dr. George Harrison Nixon, Washington, aged 37, died March 9 of perforated peptic ulcer and bronchopneumonia.

Dr. G. Gilmer Brenizer, Washington, aged 68, died March 16.

FLORIDA

The Florida Medical Association held its annual meeting at Hollywood Beach May 2, 3 and 4.

The University of Florida, under the auspices of the Florida

Continued on page 20

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Continued from page 574

State Medical Association, announces a graduate course in medicine, to be conducted June 19-24, sessions to be held in the University of Florida Infirmary.

The Florida Hospital Association held its sixth annual meeting recently at Ocala and elected Dr. Walter A. Weed, Lakeland, President for the coming year; Miss Dorothy B. Thurston, Superintendent of Halifax District Hospital, Daytona Beach, President-Elect; and F. M. Walker, Superintendent of Duval County Hospital, Jacksonville, Executive Secretary.

Dr. and Mrs. George A. Dame, Inverness, recently entertained at dinner members of the Pasco-Hernando-Citrus County Medical Society.

Dr. Jack Halton, Sarasota, is the newly elected President of the Sarasota Shrine Club.

Dr. J. J. Guerra, Tampa, is taking postgraduate work at Brady's Urological Institute, New York City.

Dr. W. L. Ashton, Umatilla, has moved into new offices in the Lake County Medical Center.

Dr. C. J. Hurlburt, Bartow, announces the leasing for a three-year period of the Bartow General Hospital.

The Jackson County Medical Society has elected the following officers for 1933: Dr. J. B. Dowling, Alliance, President; Dr. C. H. Ryals, Grand Ridge, Vice-President; and Dr. Lewis Pierce, Marianna, Secretary-Treasurer.

The Monroe County Medical Society has elected the following officers for 1933: Dr. Harry C. Gafey, President; Dr. George R. Plummer, Vice-President; and Dr. William R. Warren, Secretary-Treasurer; all of Key West.

The Palm Beach County Medical Society has elected the following officers for the coming year: Dr. S. W. Fleming, President; Dr. Vesey M. Johnson, Vice-President; Dr. James L. Carlisle, Secretary; and Dr. Frederick K. Herpel, Treasurer; all of West Palm Beach.

The St. Johns County Medical Society has elected the following officers for the coming year: Dr. A. C. Walkup, President; Dr. Gordon Fletcher, Vice-President; Dr. Reddin Britt, Secretary; and Dr. Charles C. Grace, Treasurer; all of St. Augustine.

The Taylor County Medical Society has elected the following officers for the coming year: Dr. W. J. Baker, Foley, President; Dr. Ralph J. Greene, Perry, Vice-President; and Dr. J. L. Weeks, Perry, Secretary-Treasurer.

Deaths

Dr. Ben Hill Maynard, Lakeland, aged 66, died March 5 of cardiovascular renal disease.

Dr. Robert R. Teller, Miami, aged 77, died January 19.

Dr. George P. Norton, Tampa, aged 67, died February 8 of endocarditis.

Dr. J. M. Irwin, St. Augustine, aged 61, died April 19 of a heart attack.

GEORGIA

The Medical Association of Georgia held its eighty-fourth annual session at Macon in May, with headquarters at the Hotel Dempsey.

Dr. Daniel C. Elkin, Professor of Surgery, Emory University School of Medicine, Atlanta, served recently as visiting Professor of Surgery, University of Virginia School of Medicine, University, Virginia.

The Georgia Hospital Association met in March at the Henrietta Egleston Hospital for Children in Atlanta for their third quarterly meeting.

The Georgia Urological Association held its annual meeting at Macon in May during the State meeting.

Dr. James R. McCord, Atlanta, recently conducted a series of seven courses on obstetrics in Kentucky.

Albany had its second Pre-School Health Conference in April, with Dr. N. R. Thomas and Dr. F. K. Neill, both of Albany, speaking on subjects pertaining to the normal growth and development of young children.

Dr. and Mrs. O. N. Harden, Cornelia, recently entertained members of the Habersham County Medical Society.

Continued on page 22

Phyllicin

the new theophylline salt

Phyllicin is a potent diuretic and cardiac stimulant in doses of 1 tablet two to four times a day, after meals. Prescribe Phyllicin to relieve cardiac distress and reduce edema of cardiac or nephritic origin ...

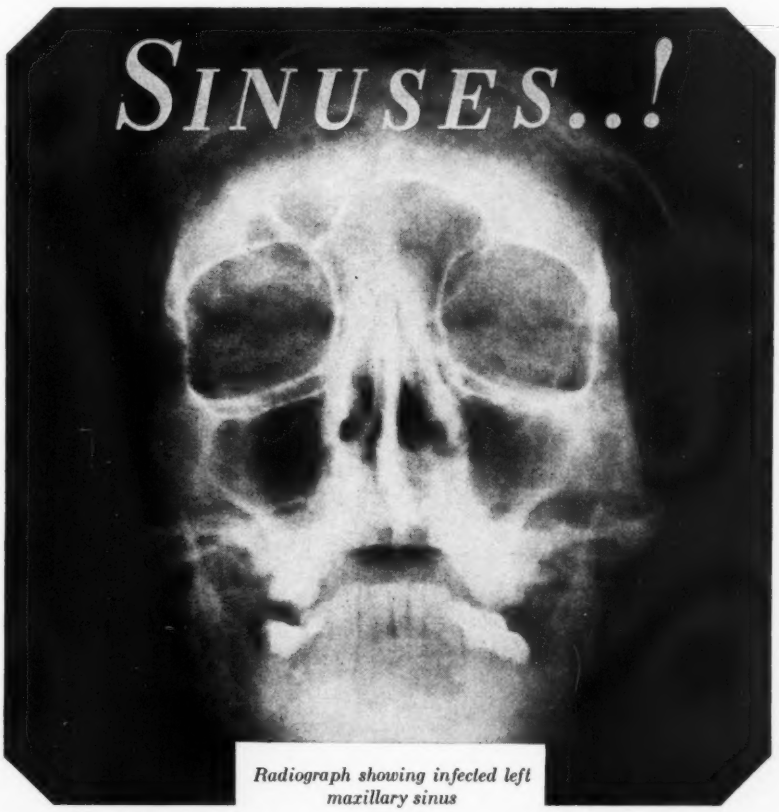
In 4 grain Tablets and as a Powder

Literature and samples upon request

Bilhuber-Knoll Corp.,

154 OGDEN AVE., JERSEY CITY, N. J.

But the Radiograph says



Radiograph showing infected left maxillary sinus

SINUS infections frequently present vague and misleading indications. Often they manifest themselves by symptoms alien to the true situation. Fever, headache, chronic cough, asthma, or even disordered kidney function may be among the outward signs. Only x-rays can definitely point out the real cause of the complaint —infection in the sinuses.

To eliminate the chance of incorrect diagnosis when the clinical history and examination afford only inconclusive evidence, refer the patient to your radiologist. His radiographs will give you positive information . . . assure an accurate differential diagnosis.

Maximum Diagnostic Information

The new Eastman Ultra-Speed X-ray Films give radiologists greatly improved facilities in their technics. They are uniform, sensitive, have greater contrast. They provide radiographs with the maximum diagnostic detail.

If you would like to receive the publication, "Radiography and Clinical Photography," regularly, mail this coupon.

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347 State Street, Rochester, N. Y.

Gentlemen: Please place my name on your free mailing list to receive "Radiography and Clinical Photography" regularly.

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Continued from page 20

Dr. C. C. Fishburne, formerly of Brunswick, has located at Darien to practice medicine.

The Cherokee County Medical Society has elected the following officers for 1933: Dr. R. M. Moore, Waleska, President; Dr. N. J. Coker, Canton, Vice-President; and Dr. George C. Brooke, Canton, Secretary-Treasurer.

The Elbert County Medical Society has elected the following officers for the coming year: Dr. D. V. Bailey, President; Dr. W. A. Johnson, Vice-President; and Dr. A. S. Johnson, Secretary-Treasurer; all of Elberton.

The Glynn County Medical Society has elected the following officers for 1933: Dr. G. W. Cheney, President; Dr. J. W. Simmons, Vice-President; and Dr. T. V. Willis, Secretary-Treasurer; all of Brunswick.

The Laurens County Medical Society has elected the following officers for 1933: Dr. William C. Thompson, President; Dr. J. J. Barton, Vice-President; and Dr. Charles L. Hicks, Secretary-Treasurer; all of Dublin.

The Ocmulgee Medical Society (Dodge, Bleckley and Pulaski Counties) has elected the following officers for 1933: Dr. A. R. Bush, Hawkinsville, President; and Dr. I. J. Parkerson, Eastman, Secretary-Treasurer.

The Ware County Medical Society has elected the following officers for 1933: Dr. C. A. Witmer, President; Dr. A. W. DeLoach, Vice-President; and Dr. K. McCullough, Secretary-Treasurer; all of Waycross.

Dr. Walter B. Brock, Tallapoosa, and Miss Tempie Virginia Patterson were married recently.

Dr. Henry M. Seymour Adams and Miss Annette Chandler, both of Atlanta, were married recently.

Deaths

Dr. James Thomas Gammage, Pineview, aged 63, died March 9 of heart disease and pneumonia following an operation.

Dr. Wilborn Arthur Upchurch, Atlanta, aged 49, died March 27.

Dr. John Colbert McAfee, Macon, aged 59, died March 27 of heart disease.

Dr. Young Allen Little, Milledgeville, aged 54, died March 15 of cerebral hemorrhage.

Try the Horlick Plan for Reducing or for Building Up...

In a reducing program, Horlick's affords a sustaining luncheon, **in place of a heavy meal,** avoiding faintness.

In building weight, Horlick's, **added to regular meals and between meals,** provides readily assimilated delicious nutriment, in concentrated form.

Listen in to our Radio Program
ADVENTURES IN HEALTH
Coast-to-Coast NBC Network
Tues. & Fri., 8:30 P. M., Eastern Daylight Time; 7:30 P. M., Central Daylight Time.

HORLICK'S, Racine, Wis.

Dr. Otis B. Salley, Augusta, aged 77, died March 2 of myocarditis and nephritis.

Dr. William N. Edenfield, Vienna, aged 69, died April 17.

Dr. Francis B. Ricketson, Warrenton, aged 73, died March 26 of heart disease.

Dr. John Martin Glover, Stapleton, aged 73, died March 11.

Dr. William F. Gann, Columbus, aged 82, died March 24.

Dr. Elijah S. Peacock, Harrison, aged 72, died April 15.

KENTUCKY

Dr. Fred W. Rankin, Lexington, was a guest speaker at the annual meetings of the West Virginia Medical Association at Charleston in May, and the Medical Association of Alabama at Montgomery in April.

Dr. James R. McCord, Atlanta, Professor of Obstetrics and Gynecology at Emory University School of Medicine, has been conducting a series of seven courses of obstetrics in Kentucky, having lectured at the City Hospital at Louisville and at Paducah.

The Bourbon County Medical Society has elected the following officers for 1933: Dr. C. G. Daugherty, Paris, President; Dr. H. M. Boxley, Millersburg, Vice-President; and Dr. W. B. Hopkins, Secretary-Treasurer.

The Grant County Medical Society has elected the following officers for 1933: Dr. J. W. Abernathy, Williamstown, reelected President; Dr. A. D. Blaine, Dry Ridge, Vice-President; and Dr. C. M. Eckler, Williamstown, Secretary and Treasurer.

The Greenup County Medical Society has elected the following officers for 1933: Dr. C. B. Johnson, Russell, President; Dr. W. S. Morris, Fullerton, Vice-President; and Dr. Carl M. Gambill, Greenup, Secretary-Treasurer.

The Perry County Medical Society has elected the following officers for 1933: Dr. Taylor Hurst, President; Dr. C. D. Snyder, First Vice-President; Dr. J. C. Coldiron, Second Vice-President; Dr. J. O. Salyers, Third Vice-President; and Dr. R. L. Collins, Secretary-Treasurer; all of Hazard.

Deaths

Dr. Foster H. Bussey, Louisville, aged 53, died March 26.

Dr. John Austin Yates, Edmonton, aged 72, died March 26 of heart disease.

Dr. Davis Montgomery Thompson, Harrodsburg, aged 89, died February 22 of influenza.

Dr. George F. Sauter, Newport, aged 66, died March 4 of arteriosclerosis.

Dr. Stephen Johnson D. Meade, Fort Thomas, aged 75, died March 15.

LOUISIANA

The House of Delegates of the Louisiana State Medical Society met in April under the Presidency of Dr. Roy B. Harrison, New Orleans, this in lieu of the annual State meeting, which was called off for this year. The following officers were elected for the coming year: Dr. Chaille Jamison, New Orleans, President-Elect; Dr. J. H. Slaughter, Bogalusa, First Vice-President; Dr. Marcy J. Lyons, New Orleans, Second Vice-President; Dr. George Wright, Monroe, Third Vice-President; and Dr. P. T. Talbot, New Orleans, reelected Secretary-Treasurer. Dr. C. A. Weiss, Baton Rouge, is the incoming President.

The Sixth District Medical Society has elected the following officers for the coming year: Dr. Glenn J. Smith, Jackson, President; Dr. F. H. Hanson, Donaldsonville, Ascension Parish, Dr. Guy Darcantel, White Castle, Iberville Parish, Dr. H. W. A. Lee, Baton Rouge, East Baton Rouge Parish, Dr. Paul B. Landry, Port Allen, West Baton Rouge Parish, Dr. C. S. Miller, Jackson, East Feliciana Parish, Dr. C. C. Blakeney, St. Francisville, West Feliciana Parish, Dr. M. O. Becnel, New Roads, Pointe Coupee Parish, Dr. E. E. Lafferty, Bogalusa, Washington Parish, Dr. John Griffith, Slidell, St. Tammany Parish, Dr. L. D. McGehee, Hammond, Tangipahoa Parish, Dr. V. J. Gautreaux, Albany, Livingston Parish, Dr. H. A. Tynes, Grangeville, St. Helena Parish, Vice-Presidents; and Dr. Cecil Lorio, Baton Rouge, reelected Secretary-Treasurer.

Dr. Hymen Leon Cohen, New Orleans, and Miss Pauline Weil Herzfeld were married in March.

Deaths

Dr. Hugh E. Atkins, Shreveport, aged 64, died February 12 of heart disease.

Dr. Ben Edward Barham, Oak Ridge, aged 48, died March 24 in a Monroe hospital of pulmonary tuberculosis.

Dr. Alexander Benjamin Sambola, New Orleans, aged 54, died February 23 of coronary sclerosis.

Continued on page 24

ANEMIA..ARTHRITIS..PELLAGRA

are RECOGNIZED *to be* RELATED

(Drs. Goldberger, Wheeler, Tanner, Walker, Wilder, Wyatt)

They are CHARACTERIZED *by* DISTURBED METABOLISM

and require an abundance of

VITAMINE-B $\binom{(F\&G)}{(B_1\&B_2)}$ in the DIET

ANEMIA

"Vitamine deficiency suggests itself by the resemblance of pernicious anemia to sprue and pellagra" (*Dr. H. M. Connor, Rochester, Minn., A.M.A., Sept. 3, 1927*). He suggests the Yeast Extract in place of more bulky yeast.

Drs. Koessler and Maurer, Chicago, Ill. (ibid) advise, "Three times daily from 1-2 teaspoonfuls of powdered Brewers' Yeast (Harris) or 3 times daily, 2 tablets of Harris Yeast Tablets."

ARTHRITIS

Dr. B. L. Wyatt, "CHRONIC ARTHRITIS and FIBROSITIS"*—says disturbed purin metabolism is a primary cause of chronic arthritis—that patients with chronic infectious arthritis show disturbance in the rate of absorption from the gastro-intestinal tract. He states, "Vitamine-B may be most satisfactorily administered to such patients in the form of—Harris Yeast extract tablets."

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PELLAGRA

In 1925, Drs. Goldberger and Tanner, U. S. Public Health Service, published cures of 26 cases of pellagra with Brewers' Yeast-Harris and advised this product for pellagra cases in doses of ½ to 1 oz. daily, with due regard to other features of the diet.

FREE SAMPLES TO PHYSICIANS

The HARRIS LABORATORIES

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TESTED HARRIS STANDARDS

Continued from page 22

MARYLAND

The Medical and Chirurgical Faculty of Maryland held its thirty-fifth annual meeting in Baltimore in April.

Dr. Emil Novak, Baltimore, Associate Professor of Gynecology at the University of Maryland School of Medicine, is on the program of the annual meeting of the British Medical Association, which will convene in Dublin in July.

The sixth course of lectures under the William Sydney Thayer and Susan Read Thayer Lectureship in Clinical Medicine was delivered in April at the Johns Hopkins University School of Medicine by Dr. Theobald Smith, formerly Director, Department of Animal Pathology, Rockefeller Institute for Medical Research, Princeton, New Jersey. This Lectureship was made possible through the donation of funds to Johns Hopkins University by friends of the late Dr. William Sydney Thayer for the purpose of endowing a Lectureship.

Johns Hopkins Hospital, Baltimore, has received a $30,000 trust fund through the will of the late Mrs. Katherine B. Judd, New York, the income from which is to be paid annually to the person who in the judgment of the trustees shall have made the greatest advancement toward the discovery of a cure for cancer. The will also provides for a bequest of $15,000 from the principal on satisfactory proof that a cure for cancer has been discovered or perfected.

Deaths

Dr. John W. Leitch, Huntington, aged 62, died March 4 of carcinoma of the stomach.

Dr. Leonard James Turlington, Baltimore, aged 77, died March 3 in a Baltimore hospital of injuries received in an automobile accident.

Dr. Robert Hooper Smith, Baltimore, aged 35, died March 5 of lobar pneumonia.

MISSISSIPPI

Dr. James W. Lipscomb, Jr., formerly of Columbus, but recently resident surgeon of the Jamaica Hospital, Richmond Hill, New York, will return to Columbus July 1 to locate for the practice of surgery and obstetrics, and will be associated with Dr. P. L. Fite in the Fite Hospital.

Dr. and Mrs. D. E. Staton, Columbus, recently entertained physicians of the city in honor of Dr. Thomas Wolford, formerly of Birmingham, who has located in Columbus as owner of the Columbus Hospital.

Dr. Alvah P. Smith, Bay St. Louis, announces the opening of his main office in Gulfport for the practice of diseases of children.

The East Mississippi Medical Society will hold a postgraduate medical institute June 6 to 9 at the Lamar Hotel, Meridian.

The Delta Medical Society met in Greenville in April for its semi-annual session, with 125 physicians present.

Dr. C. W. Patterson, formerly of Reid, has moved to Houlka, Route 3, Pontotoc County.

The Coahoma County Medical Club has reorganized and elected the following officers for the coming year: Dr. Thack G. Hughes, Clarksdale, President; Dr. Carrie Z. Ballard, Dublin, Vice-President; and Dr. Vernon B. Harrison, Clarksdale, Secretary.

The Claiborne County Medical Society at a recent meeting reelected its officers for the coming year.

Dr. W. D. Anderson, Vicksburg, will succeed Dr. Weston in charge of internal medicine at the Vicksburg Hospital.

Dr. Hugh Johnston has located offices in Vicksburg, and will limit his practice to the eye.

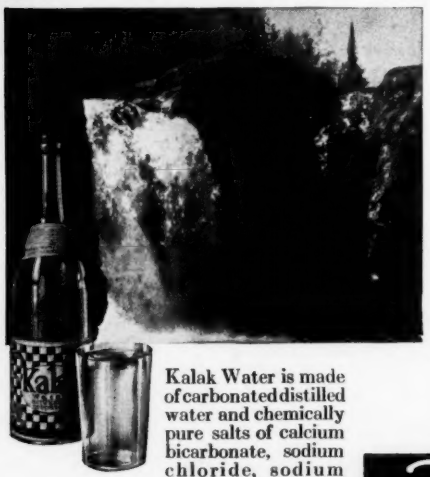
Dr. W. Pierre Robert, formerly of Birmingham, Alabama, has located in Vicksburg, and will be in charge of the Department of Pediatrics at the Vicksburg Hospital.

Scholarships for the study of medicine at Tulane University School of Medicine, New Orleans, through the Commonwealth Fund, have been granted to the following in Mississippi: Martin Luther Flynt, Meridian, Robert Peyton Vincent, Jackson, Charles

Continued on page 28

A Pure, Palatable, Carbonated

PREPARED WATER

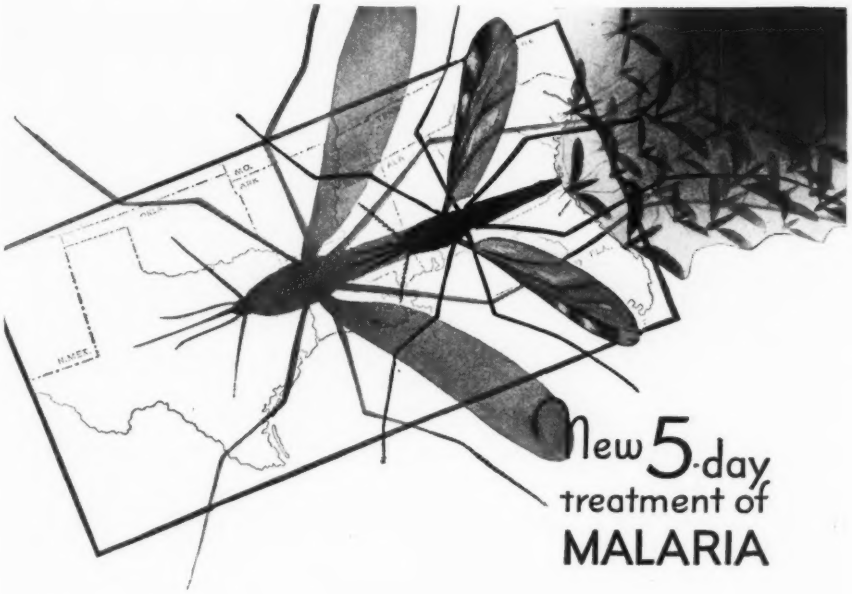


THERE are many conditions, no doubt, where you will want your patient to increase his daily intake of water.

In such cases, why not suggest the use of Kalak Water, the palatable, carbonated alkaline water prescribed by physicians for over twenty years.

Kalak Water is made of carbonated distilled water and chemically pure salts of calcium bicarbonate, sodium chloride, sodium phosphate and bicarbonates of magnesium, potassium and sodium.

Kalak



Hitherto: THREE WEEKS' treatment with quinine has been commonly required to eradicate all parasites from the blood of the malarial patient.

Now: FIVE DAYS' administration of Atabrine is sufficient to destroy the schizonts which produce the acute paroxysms and the gametocytes which transmit malaria through the mosquito.

Atabrine has none of the by-effects of quinine which so often interrupt treatment and interfere with the patient's occupation. Relapses are much less likely to occur.

Moreover, Atabrine is economical as only five days' medication is usually necessary in tertian and quartan malaria.

DOSAGE: Adults, one tablet three times daily for 5 successive days. Children, one-half to one tablet, once to thrice daily according to age.

Pamphlet containing detailed instructions will be sent to physicians on request.

ATABRINE

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(*Pronounced At'a-breen*)

Brand of Chinacrin

Supplied in tablets of 0.1 Gm. (1½ grains), with groove for division, in tubes of 15.

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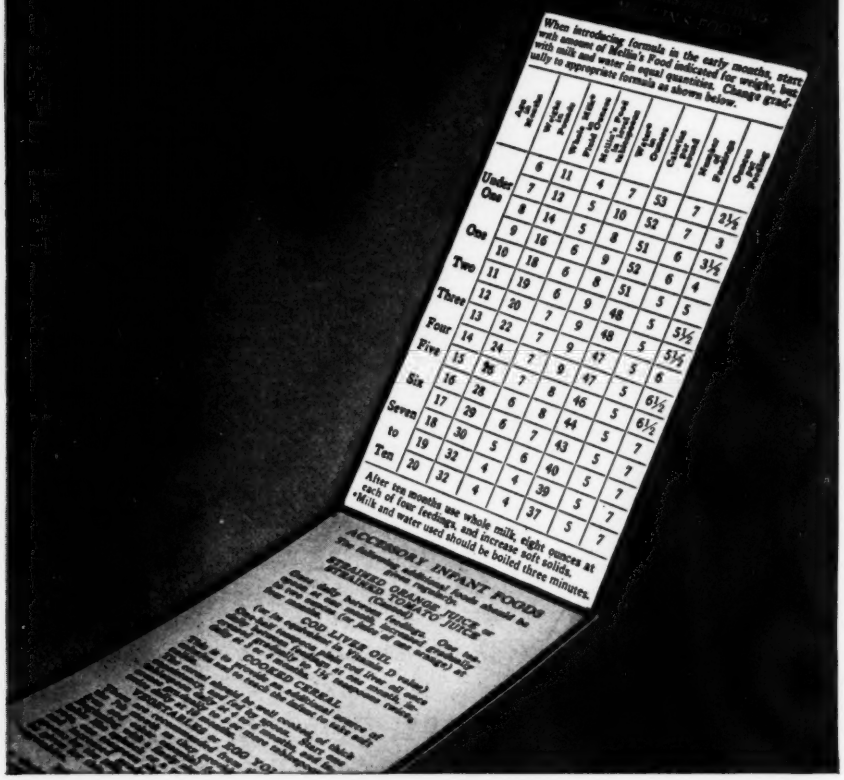
When introducing formula in the early months, start with amount of Mellin's Food indicated for weight, but with milk and water in equal quantities. Change gradually to appropriate formula as shown below.
Under One
One
Two
Three
Four
Five
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Seven to Ten
After ten months use whole milk, eight ounces at each of four feedings, and increase soft solids.
*Milk and water used should be boiled three minutes.
ACCESSORY INFANT FOODS
STRAINED ORANGE JUICE
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Tetanus Antitoxin

(SUPER-CONCENTRATED MULFORD)

BECAUSE of its small volume and low protein content, Tetanus Antitoxin Super-Concentrated Mulford is easily injected, is rapidly absorbed and produces almost immediate protection.

The small volume and low protein content also reduce the incidence of local and systemic reactions.

When continuous protection is desired, repeated doses, as recommended by some authorities, are conveniently administered at intervals of seven days.

Tetanus Antitoxin Super-Concentrated Mulford is properly aged and processed to yield a clear solution of stable potency. It is supplied in practical syringe containers, ready for prompt use, in the following unit packages: 1,500 units, 5,000 units, 10,000 units, 20,000 units.

Further information may be obtained from our representatives or by writing our Medical Department.

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Sharp & Dohme

PHILADELPHIA BALTIMORE

Continued from page 24

Roderick Jenkins, Hattiesburg, Thomas Lambert, Charleston, and Howard Alexander Nelson, Tunica.

Cora B. Keyes, McComb, has been made Superintendent of the McComb City Hospital.

DEATHS

Dr. Hampden Sidney Lewis, Bay St. Louis, aged 65, died March 11 in a New Orleans hospital following an operation for appendicitis.

Dr. J. A. Donaldson, Okolona, died recently.

MISSOURI

The Missouri State Medical Association held its seventy-sixth annual meeting at Kansas City, May 1 through 4, with headquarters at the President Hotel.

Dr. James Archer O'Reilly, St. Louis, was recently appointed Associate Professor of Orthopedics at the St. Louis University School of Medicine.

Dr. Mazyck P. Ravenel, Columbia, was recently made an honorary member of the Royal Sanitary Institute of Great Britain.

The St. Joseph Clinical Society held its annual spring clinic at St. Joseph in April, the Buchanan County Medical Society cooperating.

The Carter-Shannon County Medical Society has elected the following officers for 1933: Dr. Frank Hyde, Eminence, Chairman; and Dr. W. T. Eudy, Eminence, Secretary.

The St. Francois-Iron-Madison County Medical Society has elected the following officers for 1933: Dr. Harry Barron, Fredericktown, President; Dr. Ralf Hanks, Farmington, Vice-President; and Dr. S. C. Slaughter, Fredericktown, Secretary-Treasurer.

The Vernon-Cedar County Medical Society has elected the following officers for 1933: Dr. E. R. King, Nevada, President-Elect; and Dr. L. L. Cooper, Nevada, Secretary.

DEATHS

Dr. Tilley Alexander Martin, St. Louis, aged 84, died February 4 of carcinoma of the rectum.

Dr. Frederick C. Ameiss, St. Louis, aged 74, died March 19 of pernicious anemia and carcinoma of the stomach.

Dr. Joseph Stanley Lichtenberg, Kansas City, aged 63, died April 2.

Dr. John Logan McAlister, Wardell, aged 51, died February 27 of pneumonia.

Dr. Estill Victor Wedding, Kansas City, aged 58, died February 7 of heart disease.

Dr. George E. Muns, Montgomery City, aged 76, died March 17 of myocarditis.

Dr. Thomas William Scanlon, Polo, aged 65, died March 15 in an automobile accident.

Dr. William Kerwin, St. Louis, aged 47, died March 6.

Dr. George Alexander Graham, Kansas City, aged 73, died March 23.

NORTH CAROLINA

The Beaufort and Jasper Counties Medical Society has elected the following officers for the coming year: Dr. H. C. Foster, Beaufort, President; Dr. Pinckney Ryan, Ridgeland, Vice-President; and Dr. H. F. Wilson, Beaufort, Secretary and Treasurer.

Dr. Elias S. Faison, Charlotte, has opened offices in the Medical Arts Building, with practice limited to internal medicine.

Dr. Lawrence Lincoln Beall, Durham, and Miss Virginia Graham McLean were married in April.

DEATHS

Dr. George Hooper Mallett, Hendersonville, aged 69, died March 22 of heart disease.

Dr. Eric Alonzo Abernethy, Chapel Hill, aged 56, died March 21.

OKLAHOMA

The Oklahoma State Medical Society held its forty-first annual meeting at Oklahoma City May 15-17, with headquarters at the Skirvin Hotel.

The Southern Oklahoma Medical Association held its quarterly meeting at Ada in March.

Dr. C. O. Epley, Oklahoma City, has moved into new offices in the Osler Building.

Dr. Herman Fagan, Oklahoma City, has removed his offices from the Medical Arts Building to 400 West Tenth Street.

DEATHS

Dr. Hugh P. Markham, Pauls Valley, aged 65, died March 7 of chronic nephritis.

Dr. Clifton Alembe Howell, Oklahoma City, aged 58, died March 17 of arteriosclerosis and heart disease.

Dr. George W. Hinchee, Oklahoma City, aged 73, died March 11 of hypostatic pneumonia.

Dr. R. H. Harper, Afton, aged 64, died February 22.

SOUTH CAROLINA

The Virginia, North Carolina and South Carolina Hospital Association held a joint session at Charleston, South Carolina, in April.

The South Carolina Medical Association held its eighty-fifth annual meeting in Spartanburg in April.

Continued on page 30

The Ella Oliver Home

A private maternity home for the care and protection of unfortunate girls during pregnancy and confinement.

Under auspices of Women's Christian Association of this city.

Staff physician in daily attendance or may have any other ethical physician. Modern hospital equipment, graduate nurse. Rates very reasonable. Adoption or board arranged for babies.

Strictest privacy is maintained, correspondence confidential.

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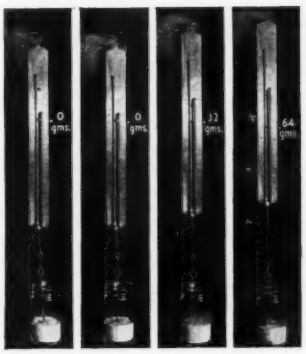
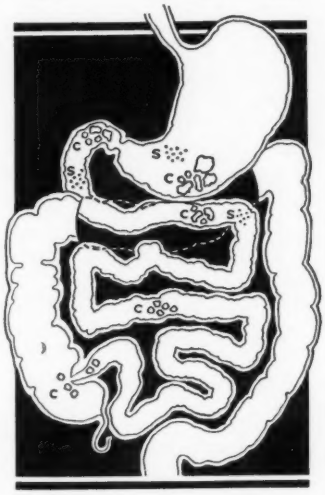
CURD TENSION

- AND INFANT FEEDING -

ITS · EFFECT · UPON · THE · ASSIMILATION · OF CARBOHYDRATES



BREAST MILK | SIMILAC | POWDERED MILK | COW'S MILK



C—Cow's milk S—Similac
Schematic drawing of the relative size of the curds of cow's milk and Similac vomited by six weeks old puppies after one-half hour's ingestion.

THE curds of milk contain only a small amount of carbohydrates, sufficient, however, to be a disturbing factor in infant feeding.

"A large part of the digestion and absorption of the carbohydrates takes place in the upper part of the small intestines."[1]

"The disaccharides, maltose, sucrose and lactose, are converted into monosaccharides through the action of enzymes secreted by the small intestine and are absorbed in the form of monosaccharides.

"When absorption is impaired, some sugar may reach the large intestine and here be attacked by the bacteria present. Sugar itself rarely appears in the stool, it being decomposed to form acids and gases."[2]

The large, tough curds of cow's milk are more slowly disintegrated and thus more slowly release the encased carbohydrates than the soft, flocculent curds of SIMILAC.

The disintegration of the curd of cow's milk may not be completed until after the curd, with the encased carbohydrate, has passed that portion of the small intestine where the enzymes for the conversion of disaccharides into monosaccharides are present. There is not this possibility when SIMILAC is fed because the fineness of the curd of SIMILAC does not permit of the encasement of carbohydrates to any extent.

The finer the curd the greater the surface area. The greater the surface area the more exposed are the fats, carbohydrates, proteins and salts to the digestive enzymes. Result . . . a more complete utilization of the food elements.

[1] London & Polowzowa: Zeitschr. f. physiol. Chem. 1906, XLIX, 328.

[2] Marriott: Infant Nutrition, pg. 81.

Samples and literature will be sent on receipt of your prescription blank.

SIMILAC—Made from fresh skim milk (casein modified); with added lactose, salts, milk fat and vegetable and cod liver oils.

M & R
DIETETIC LABORATORIES, INC.,
COLUMBUS, OHIO.

Continued from page 28

Dr. John L. Bruce and Miss Helen F. Chandler were married at Florence recently.

Dr. R. Keith Charles, formerly of Timmonsville, has moved to San Francisco and is doing surgery at the Lattiman Hospital.

DEATHS

Dr. John Benjamin Owens, Rock Hill, aged 65, died March 12.

Dr. J. D. Funderburk, Lancaster, aged 77, died in March.

TENNESSEE

Dr. W. S. Leathers, Dean of Vanderbilt University School of Medicine, Nashville, who recently declined a call to the deanship of a great medical school, was honored with a testimonial dinner on May 12 at the Belle Meade Country Club attended by about one hundred physicians and their wives. Dr. Leathers has been Dean of Vanderbilt University for five years. He has achieved many things for the institution and has endeared himself to his associates. Many speeches testified to his tact, patience, persistence and efficiency. His friends congratulated themselves because for the fifth time he had declined offers from other institutions.

At the one hundredth annual session of the Tennessee State Medical Association in Nashville recently the following officers for the coming year were elected: Dr. Hiram B. Everett, Memphis, President; Dr. Kyle C. Copenhaver, Knoxville, Dr. William S. Rude, Ridgetop, and Dr. George G. Mulherin, Brownsville, Vice-Presidents; and Dr. Harrison H. Shoulders, Nashville, re-elected Secretary-Editor.

Dr. Horton R. Casparis, Nashville, was a guest speaker on the program of the West Virginia Medical Society at its meeting in May.

Dr. E. C. Ellett, Memphis, was elected Vice-President of the Pan-American Medical Association at its recent meeting.

Dr. J. Ralph Hamilton, Knoxville, has moved into new offices at 421 West Church Avenue.

Dr. F. L. Young, Knoxville, has moved into new offices in the Acuff Building.

Dr. M. T. Tipton, Memphis, has become associated with the Union City Clinic.

The Memphis Polyclinic was destroyed by fire in March, and did much damage to equipment and doctors' offices.

Dr. Edwin W. Cocke, Bolivar, Superintendent of Western State Hospital, was recently appointed State Commissioner of Institutions. His place as Superintendent at the Hospital has been filled by Dr. Wesley W. Wallace.

Dr. Marcus G. Spingarn, Memphis, has succeeded Dr. Alfred B. DeLoach, deceased, as a member of the Tennesaee State Board of Medical Examiners.

Dr. Arthur Harrison, Loudon, has reopened the offices formerly occupied by his father, the late Dr. Will Harrison.

The Monroe County Medical Society has elected the following officers for 1933: Dr. T. M. Roberts, President; Dr. J. A. Hardin, Vice-President; and Dr. William J. Cameron, Secretary-Treasurer; all of Sweetwater.

Dr. Herbert Sessions Wells, Nashville, and Miss Salome Winckler were married recently.

DEATHS

Dr. Luther Elonzo Wheat, Lewisburg, aged 50, died March 11.

Dr. Alfred B. DeLoach, Memphis, aged 64, died March 17 of pneumonia and influenza.

Dr. John Porter Davis, Morristown, aged 63, died suddenly March 3 of myocarditis.

Dr. James C. Crunk, Belfast, aged 81, died January 13.

Dr. A. H. Longmire, Lost Creek, aged 79, died February 24 of heart disease.

TEXAS

The Texas Club of Internists met at Fort Worth in March for its regular spring session, and elected the following officers for the coming year: Dr. W. E. Nesbit, San Antonio, President; Dr. C. W. Stevenson, Wichita Falls, Vice-President; and Dr. M. D. Levy, Houston, Secretary-Treasurer.

Dr. R. H. Crockett, San Antonio, is the newly elected President of the Staff of the Robert B. Green Memorial Hospital, San Antonio; Dr. Ed Coyle is Vice-President; and Dr. C. E. Bosshardt, Secretary.

Continued on page 32

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Continued from page 30

The Northwest Texas Hospital at Amarillo has the following new members of the Board of Managers: Dr. B. M. Puckett, Dr. Roy Vineyard, and Dr. Richard Keys, all of Amarillo.

Dr. Ferdinand P. Herff, San Antonio, was elected Chairman of the Board of Managers, and Dr. B. F. Stout was continued as Vice-Chairman and was made Chairman of Medical Affairs.

Dr. B. C. Ball, Dr. S. J. R. Murchison, Dr. L. O. Godley, Dr. X. R. Hyde, Dr. Nelson Dunn, Dr. A. W. Montague, Dr. A. W. Hiller, Dr. C. A. Ward, and Dr. W. O. Talbot, all of Fort Worth, have been named Directors of the Physicians and Dentists Business Bureau of that city.

Dr. Edward H. Cary, Dallas, was recently honored by the Medical Club of Philadelphia with a dinner at the Bellevue-Stratford Hotel.

Announcement has been made of the enlarging of the Overall Memorial Hospital at Coleman by the addition of a two-story extension, providing eleven new rooms.

The Fisher-Stonewall Counties Medical Society has elected the following officers for 1933: Dr. J. G. Hambright, President; and Dr. T. J. Barb, Secretary-Treasurer; both of Roby.

Dr. J. W. Haynie has moved from Fort Worth to Grapevine.

Dr. R. L. Powers has located at San Angelo, coming from Wenatchee, Washington.

Dr. W. M. Routon, formerly of Kilgore, has moved to Los Angeles, California.

Dr. G. E. Southern has moved from Brenham to Burton.

Dr. G. H. Wood has moved from Longview to Big Spring.

Deaths

Dr. James Edward Coyle, San Antonio, aged 71, died March 20 of coronary occlusion.

Dr. Franklin E. Haynes, Abilene, aged 70, died March 21 of cerebral hemorrhage.

Dr. William W. Cooper, Commerce, aged 61, died February 25 of cardiac insufficiency.

Dr. Ethel Mary Lyon Heard, Houston, aged 56, died suddenly March 10.

Dr. William Harriet Woods, Kerrville, aged 62, died February 9.

Dr. John M. V. Wills, Corsicana, aged 86, died March 8 of arteriosclerosis.

Dr. Charles J. Parris, Newcastle, aged 55, died March 7.

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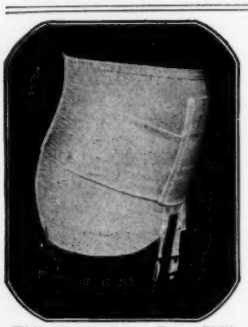

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Dr. John Newton Powell, Laketon, aged 74, died in December of diabetic gangrene.

Dr. Julian T. McLamore, Megargel, aged 57, died February 6 of influenza and myocarditis.

VIRGINIA

The Norfolk County Medical Society held its annual all-day clinic in April.

The Virginia Society of Otolaryngology and Ophthalmology met in Harrisonburg in May for its annual session under the Presidency of Dr. Frank P. Smart, Norfolk.

The Northampton County Medical Society met in Eastville in April for its regular quarterly session.

Dr. E. Terrill Montgomery, formerly of Richmond, and an alumnus of the Medical College of Virginia, has located in New York City to practice medicine.

Dr. Edwin P. Lehman, Professor of Surgery, University of Virginia School of Medicine, University, served as visiting Professor of Surgery recently at the Emory University School of Medicine, Atlanta, Georgia.

Dr. W. L. Varn, South Hill, is the newly elected President of the Rotary Club of his city.

Dr. Frederick Pilcher, Jr., alumnus of the University of Virginia Medical Department, has completed a course of study in Vienna and has returned home to begin a fellowship with the Mayo Foundation, Rochester, Minnesota.

The Virginia Hospital Association, which met jointly with the North and South Carolina Associations at Charleston, South Carolina, in April, has elected the following officers for the coming year: Dr. W. T. Sanger, Richmond, President; Miss Virginia Thacker, Roanoke, Vice-President; and Dr. Lewis E. Jarrett, Richmond, Secretary-Treasurer.

Dr. Stuart McGuire and Dr. W. T. Sanger, Richmond, represented the Medical College of Virginia at a recent meeting of the West Virginia alumni at Charleston, West Virginia.

Dr. John M. Bailey, formerly of Hopewell, has located at Richmond, with offices in the West End Medical Building.

The Southwestern Virginia Medical Society met in Pulaski in March for its regular semi-annual meeting.

The Medical Association of the Valley of Virginia met at Clifton Forge in May.

Dr. Hawes Campbell, Jr., Richmond, and Miss Ellen James Hudgens were married in April.

Dr. Wilmore R. Sherrick and Mrs. Helen Crouch Long, both of Richmond, were married in March.

Dr. Irwin Clay Hanger, Staunton, and Miss Sarah Baldwin were married in April.

Deaths

Dr. Harry Tilden Hopewell, Strasburg, aged 56, died March 18 as the result of paralysis.

Dr. B. Arthur Middleton, Emmerton, aged 77, died April 3.

Dr. George W. McAllister, Hampton, aged 56, died March 30 from toxemia.

Dr. Nathaniel Albert Nicholson, Back Bay, aged 53, died April 3 in a Norfolk hospital.

Dr. John Hansford Thomas, Greenville, aged 60, died February 1.

WEST VIRGINIA

The class of 1932 and other alumni of the West Virginia University School of Medicine recently presented to the school a portrait of Dr. John Nathan Simpson, Dean of the University since he organized it in 1902.

The Mingo County Medical Society has elected the following officers for 1933: Dr. J. Carl Lawson, President; Dr. George T. Conley, Vice-President; and Dr. Fred Ben Quincy, Secretary-Treasurer; all of Williamson.

Dr. Percy Paul Pharr, formerly of Lillybrook, has located at Alderson.

The West Virginia Alumni of the Medical College of Virginia held a meeting in Charleston recently and elected the following officers: Dr. S. W. Price, Scarboro, President; Dr. Roy Miller, Parkersburg, Vice-President; and Dr. W. L. Cook, Charleston, Secretary.

Dr. Eugene Scott Brown, Tioga, and Miss Margaret Louise Huddleston were married recently.

Deaths

Dr. Edgar L. Bossett Plant, Wheeling, aged 63, died suddenly March 23 of heart disease.

Dr. Robert Pearl Wood, Oak Hill, aged 47, died April 16 of pneumonia.

Dr. Joseph Bascumb Kirk, Bluefield, aged 70, died April 19.

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Consists of wheatmeal, oatmeal, cornmeal, wheat embryo, yeast, alfalfa leaf and beef bone. Supplies vitamins A, B, E and G and calcium, phosphorus, iron, copper and other essential minerals.

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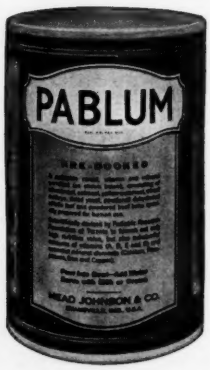
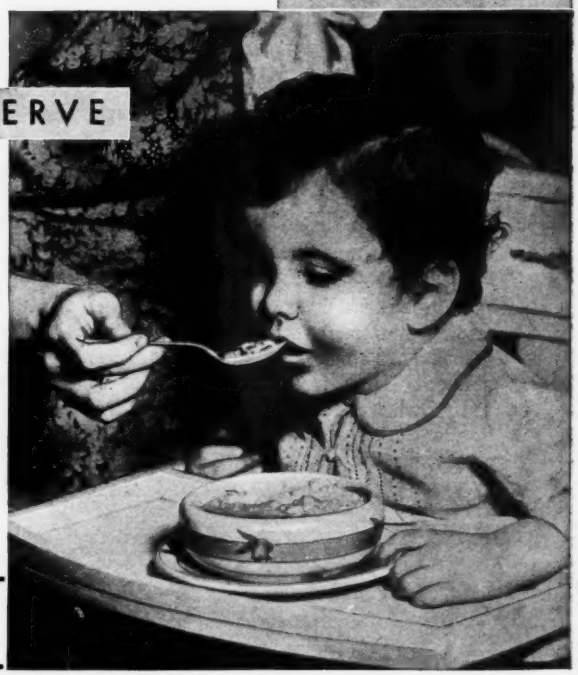


4 SERVE



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